THE FASTEST MAC EVER! MACINTOSH IIFX

MACWORLD

The Macintosh® Magazine May 1990 $3.95 Canada $4.95

MACINTOSH IIfx

The Fastest Mac Ever!



8 PAGE-MAKEUP PROGRAMS COMPARED

BEHIND LOCKED DOORS
Manufacturing the Mac: Page 306

ONE HUNDRED 2400-BPS MODEMS

MAC TO VAX
All about DEC Connections

COMPARING DATABASE MANAGERS
FoxBase+/Mac, 4D, Double Helix 3, Omnis 5

HOW TO BUILD AN ELECTRONIC ROLODEX

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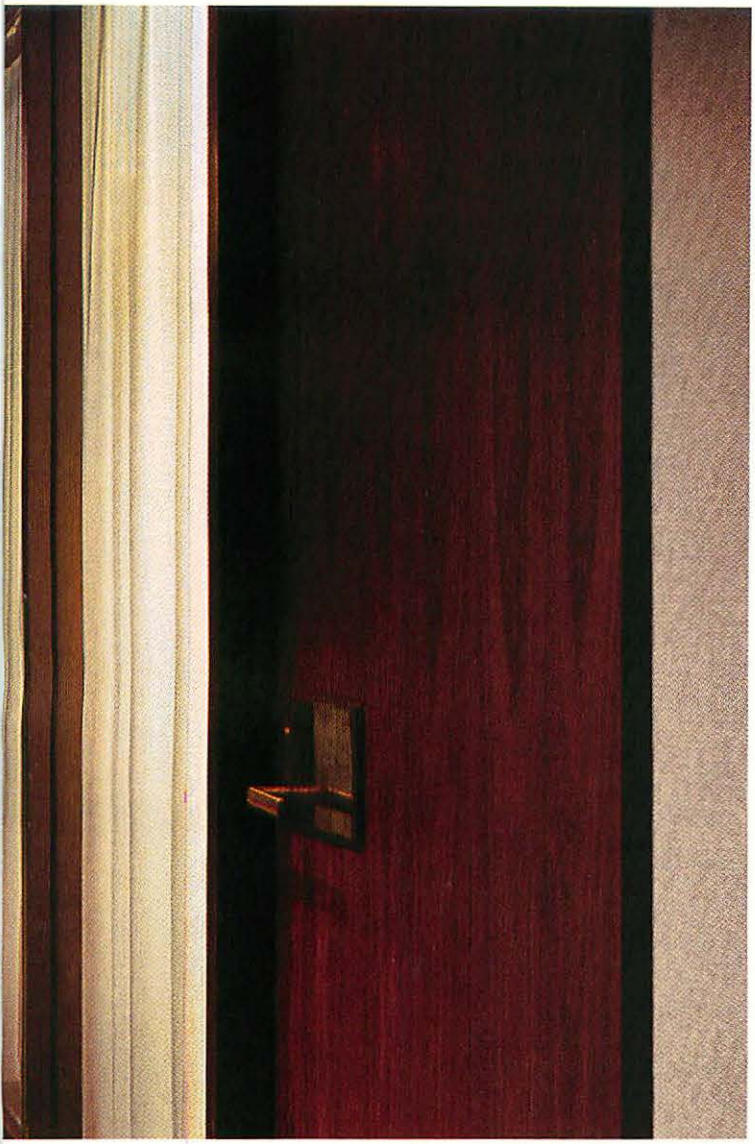
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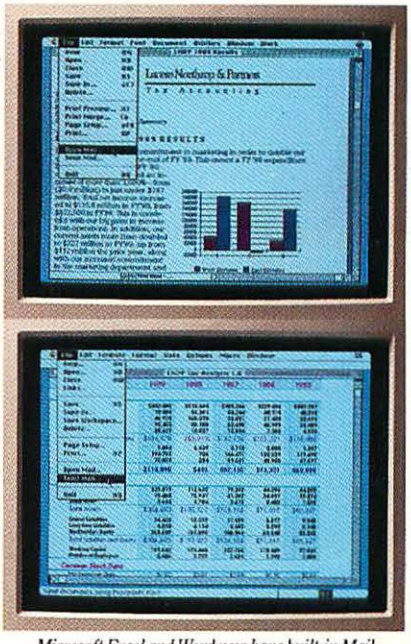
Then, if those receiving your report are in Word, they can access your document with one keystroke, digest it, add pertinent info, even attach suggested changes. And spit it right back to you without leaving their program.

Now if you think that's whiz-bang, consider this: When you combine Microsoft Excel with Mail, you can do infinitely more than share spreadsheets.

Thanks to Microsoft Excel's built-in macro language, you can do stuff like write your own macro to receive, process, and fulfill orders.

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And that's just one example of how Microsoft Excel and Mail allow you to consolidate and distribute data across a network automatically. Even if you have both Macintoshes® and PCs.



Microsoft Excel and Word now have built-in Mail support. So you can send documents without ever leaving your program. Or entering the hallway.

Now that we've covered some of the unique ways that Microsoft Excel, Word and Mail work together, we'd like to add one more significant point.

We design every Microsoft application with a single goal in mind: To continually exploit the Macintosh's capabilities in ways that profoundly promote productivity. And, of course, keep users attached to their chairs.

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An open letter to the Macintosh community.



Dear Macintosh Community,

In our business, you can't predict the future . . . but you can try to invent it. That's because the real power of what we do resides not in the tools that we build, but in what people are inspired to do with those tools. And that's the result of the most wonderfully unpredictable element of all: people's imaginations.

In the 1980s, our industry grew from a hobby for the few to one of the most significant and encompassing movements in history. At the same time, Apple grew from a small-time recreational electronics company to a Fortune 200 mainstream personal computing corporation. But while we have become a large global enterprise, we are also a young, adventurous company willing to take bold risks. And while our business has become more competitive and complex, we've remained true to our mission: to change the way people think, work, learn, and communicate by providing exceptional personal computing products.

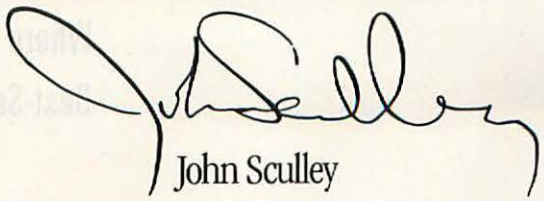
Today, Macintosh is an extraordinarily successful family of personal computers to which we continue to add new exciting CPUs every year. Our latest addition, the Macintosh IIfx, is the highest performance computer we have ever built. It's a Macintosh through and through with no compromises in the user experience, the consistency of the Macintosh way of doing things, or the compatibility with other Macintoshes. Over the next year, we'll introduce even more new CPUs with the same kind of consistent functionality you've come to expect from Macintosh.

Macintosh will continue to be our mainstream platform for the 1990s. Because we shape both our system software and hardware platforms, there's tremendous opportunity for innovation. We can do it faster and better because we can design and integrate all elements of our system to work in harmony, responding simply and intuitively to the touch. And our architecture has been well thought out, and designed to incorporate new capabilities. We're seeing many examples of this as we integrate multimedia technologies into our Macintosh systems.

As technical capabilities become more varied and sophisticated, I believe users will really appreciate our "no compromise," consistent approach. More and more, the Macintosh advantage will be in the driving experience, not just in the visual appearance of our dashboard.

Apple will continue to be the champion of innovation for the individual user in the 1990s. We know there are more wonderful user-centered ideas that we can bring to the world in the years ahead. We have the talent, the resources, and the commitment to do nothing less. In fact, in the next three years alone, we think you'll see more exciting new things from Apple than in our entire history to date.

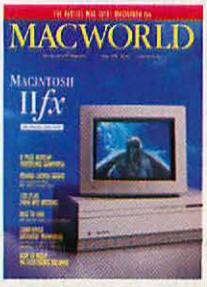
Nothing motivates us more than people who love our products. Your enthusiasm and loyalty inspire us to make our products better and better. We have many wonderful and talented people at Apple who want to help our Macintosh users change their world. You can count on us because we know we can count on you.



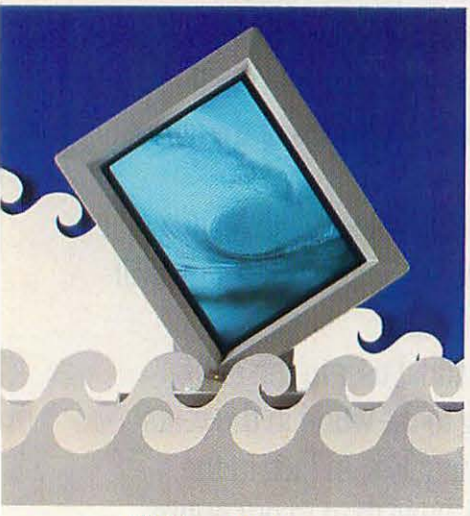
John Sculley

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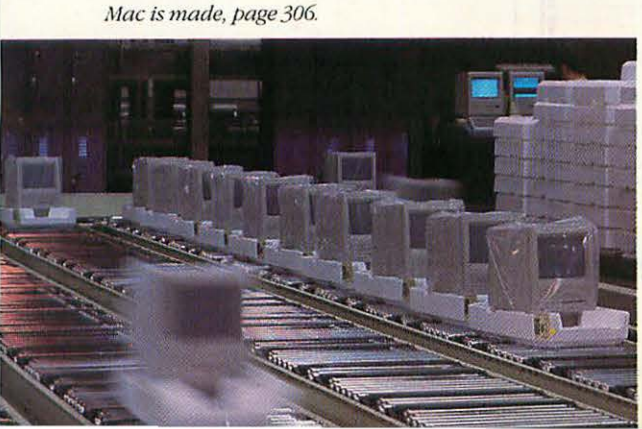
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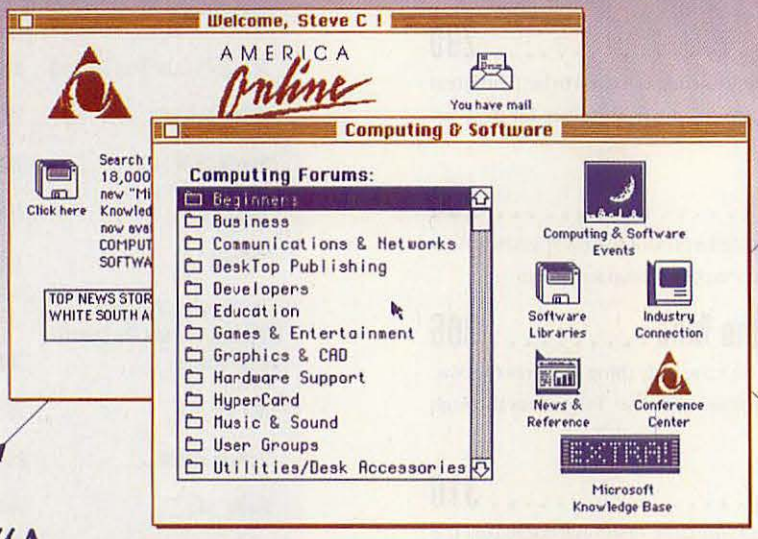
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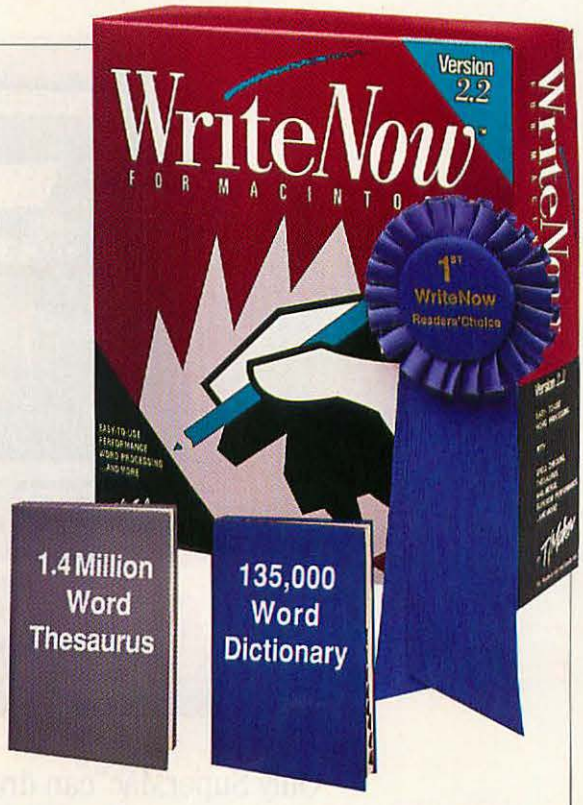
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—INFOWORLD MAGAZINE

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'Best New Word Processor'—MACUSER

1989 Readers' Choice Award,
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—PC WEEK MAGAZINE

Comparison of Leading Word Processors

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Actual disk space needed:	**(2) 800K**	Hard disk	Hard disk	Hard disk
Thesaurus:	**1.4 million**	220,000	220,000	No
Spell Checker:	**135,000**	100,000	130,000	60,000
Mail Merge:	**Yes**	Yes	Yes	Yes
Format Accelerators:	**Yes**	No	Yes	No
Multiple Header/Footers:	**Yes**	No	Yes	No
Extensive Undo:	**Yes**	No	No	No
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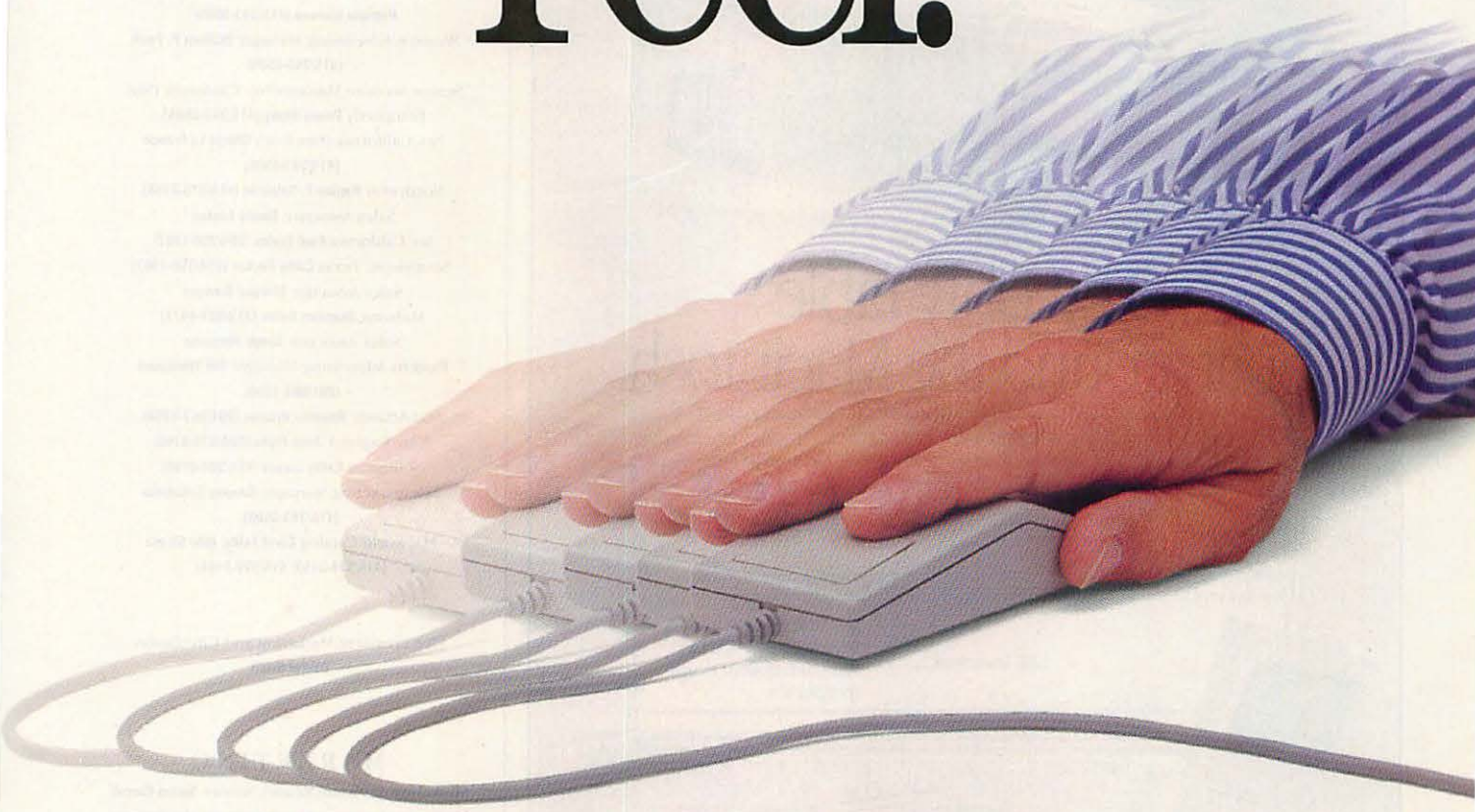


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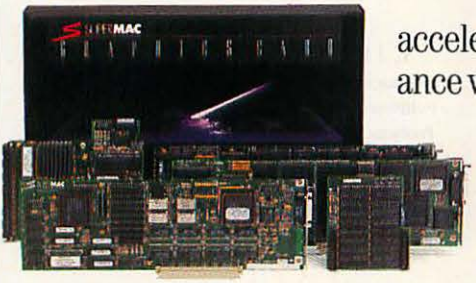
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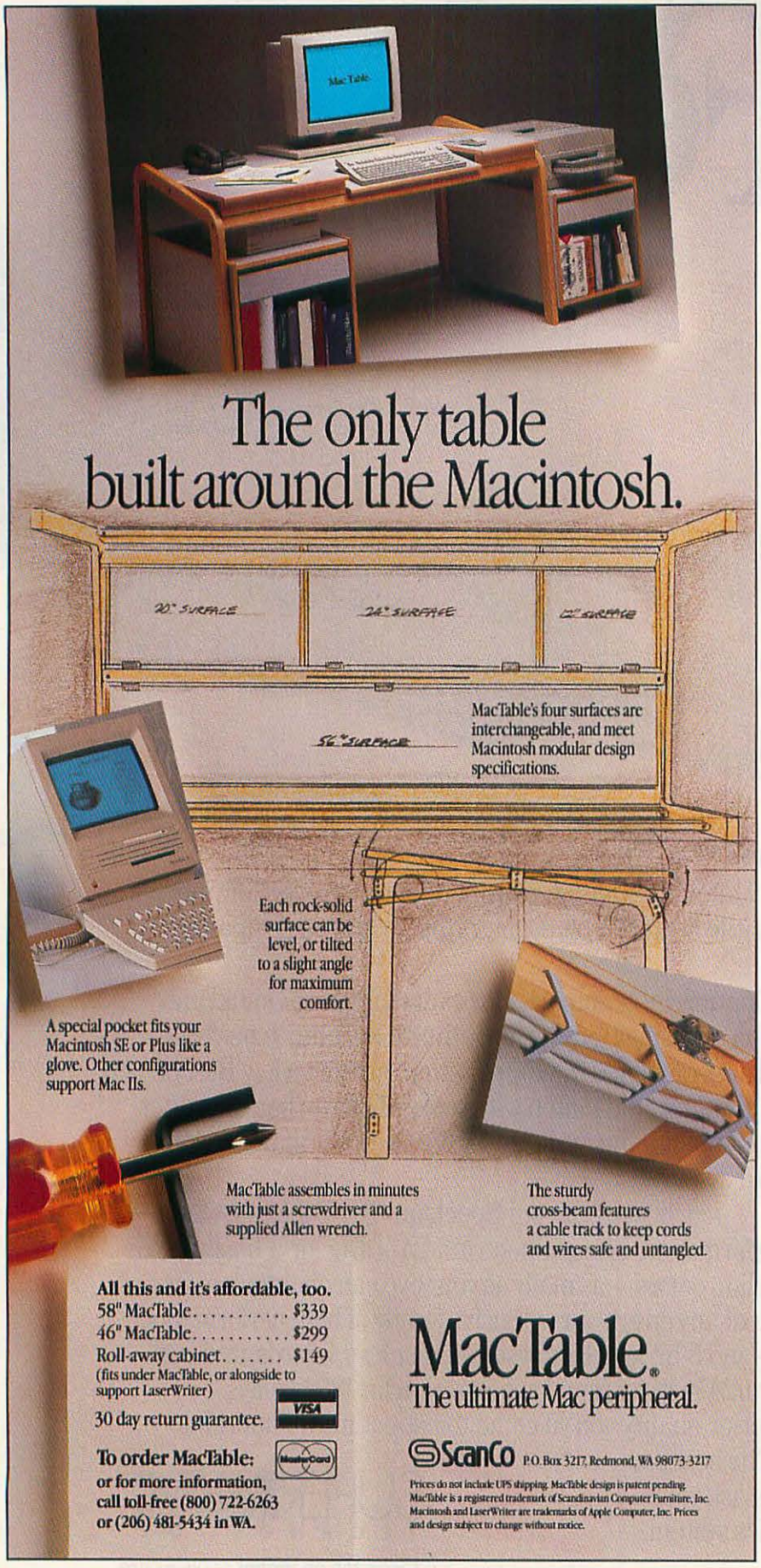
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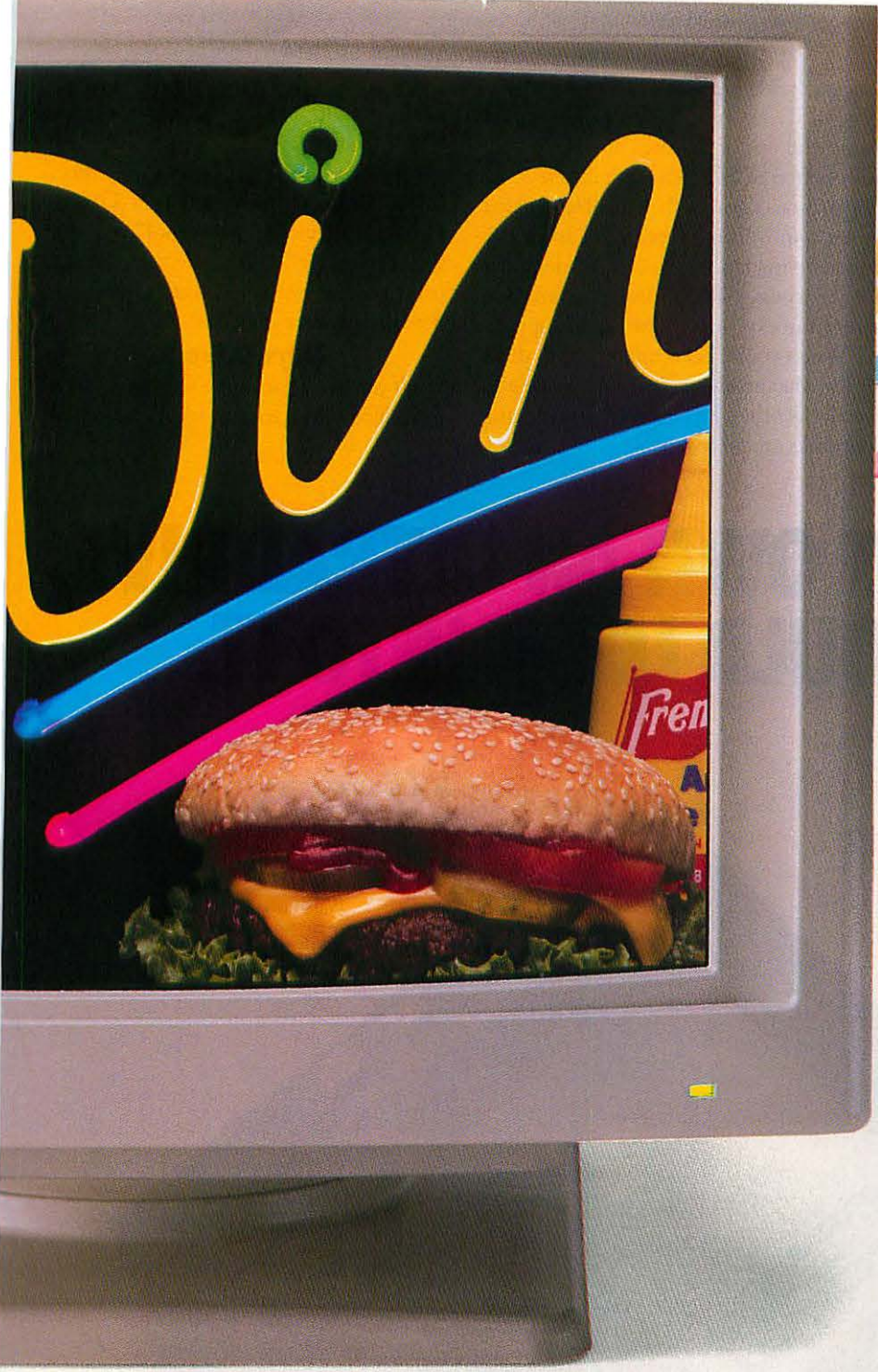
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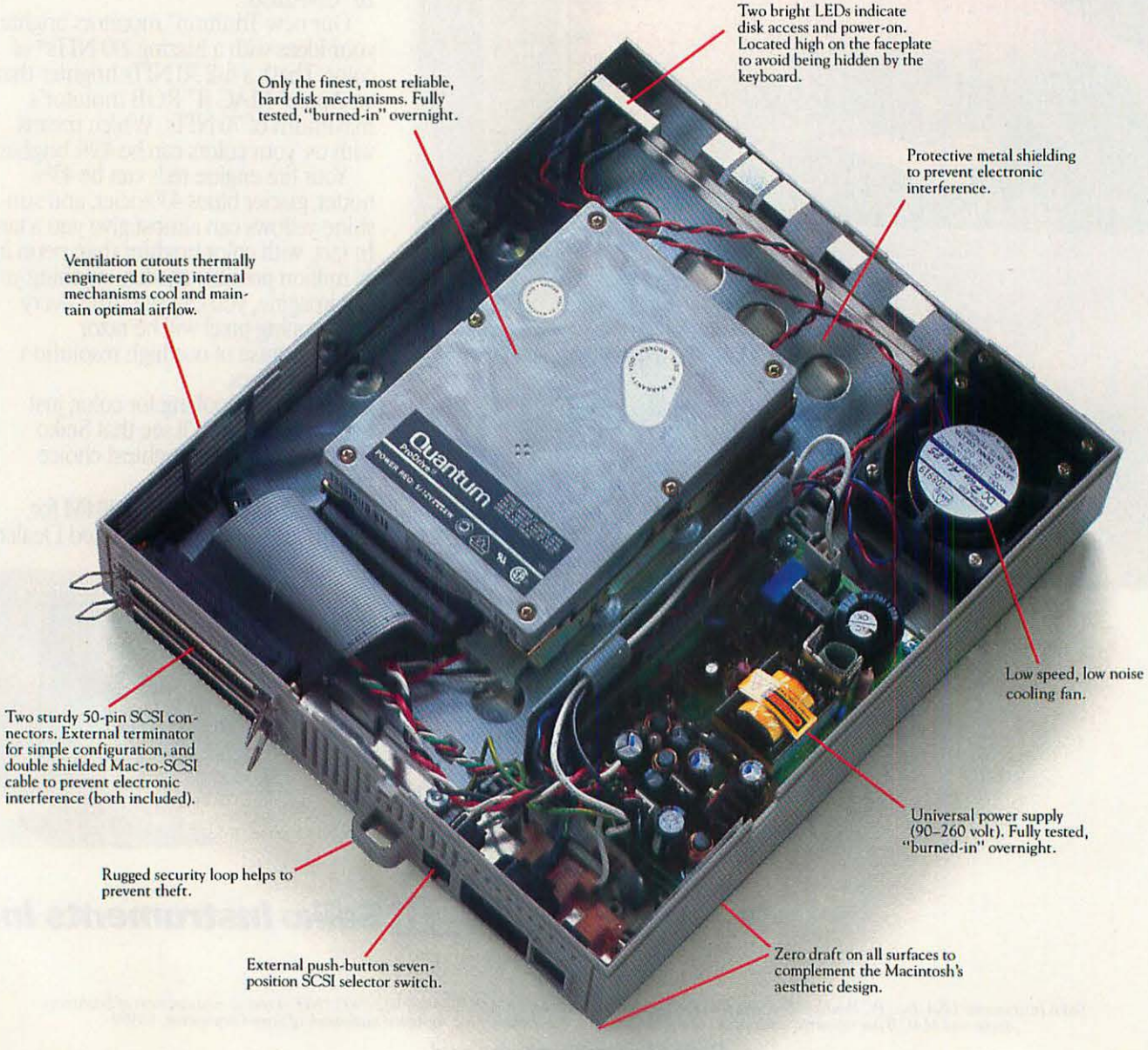
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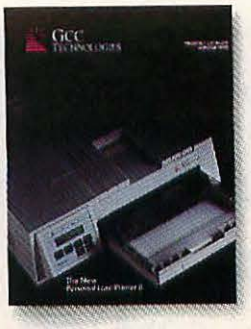
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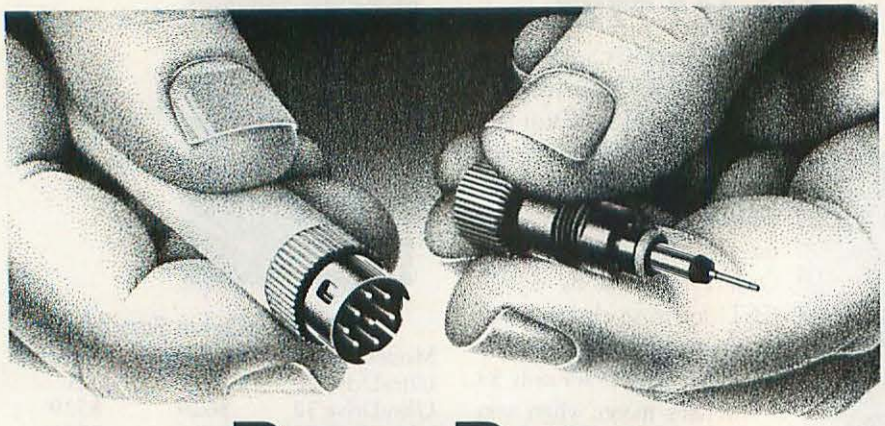
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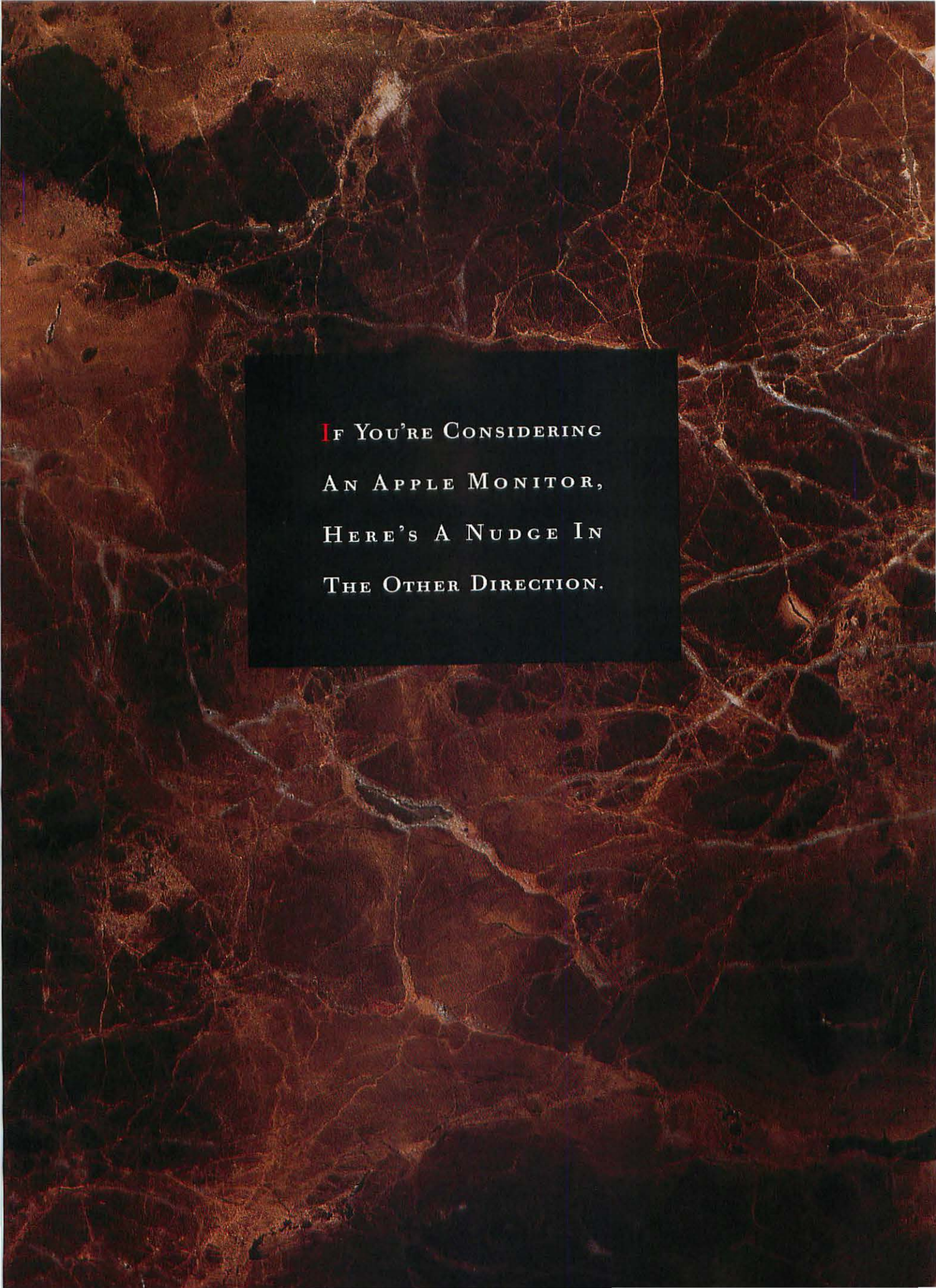
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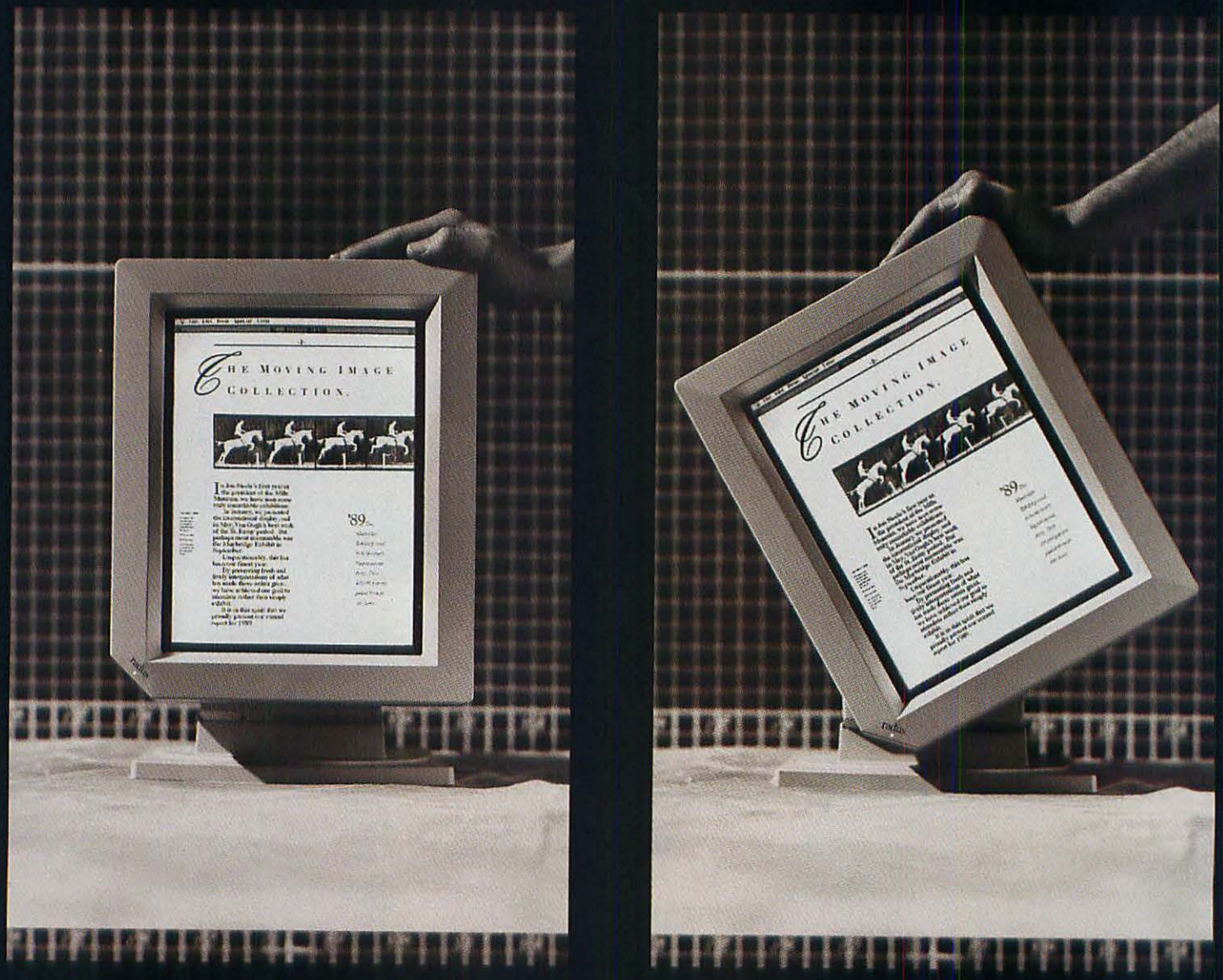
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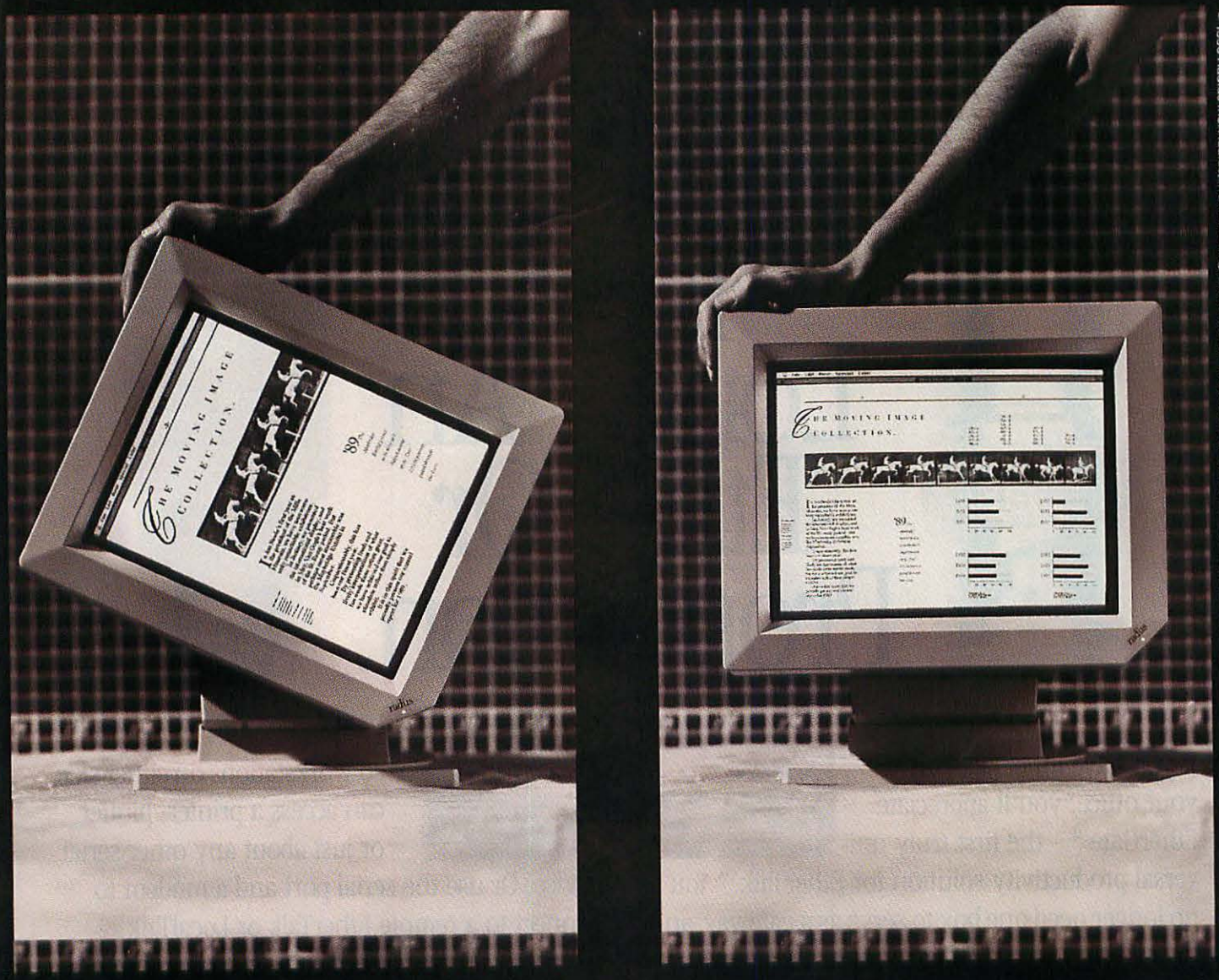
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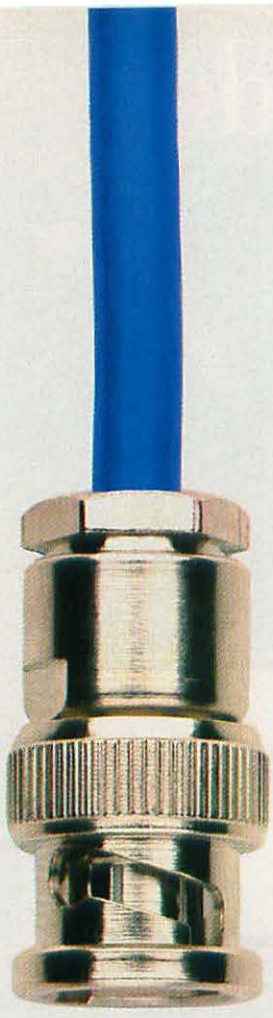
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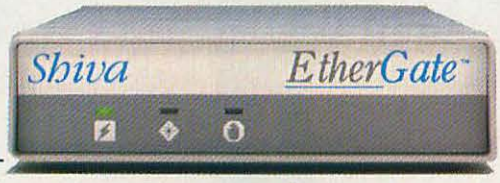
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Finally! Apple Extends Warranty to One Year

Let the Apple world rejoice! At long last Apple has increased its warranty to one year on all its hardware sold in the United States. The new policy covers hardware products purchased after January 1, 1990, and provides for service from any authorized reseller in the world. However, if you buy hardware in the United States and get it repaired overseas, you must pay for the repair and be reimbursed by Apple. Apple already offers a one-year warranty outside the United States. Apple also is offering a promotion through May 31, 1990, on its AppleCare extended service plan. Customers who bought Apple hardware in the United States before January 1, 1990, can purchase 12 months of coverage for the price of 6 months.

Apple Lowers CPU, Printer Prices

Apple has dropped list prices on all its Mac SE and SE/30 models and on LaserWriter IINTs and IINTXs. A 1MB dual-floppy SE now lists for $2569, down $300; with a single floppy and a 20MB hard drive, the SE lists for $2969, a $500 drop; with 2MB of RAM and a 40MB hard drive, it lists for $3369, down $700. New SE/30 prices are $3869 for a dual-floppy system, down $500; $4369 for an SE/30 with a 40MB hard drive, down $500; and $5569 with 4MB RAM and an 80MB hard drive, down $1000. The LaserWriter IINT dropped $500 to $4499, and the IINTX $1000 to $5999. Though recent management shakeups and reduced earnings have certainly focused Apple's attention on the lack of a low-price machine, the Mac Plus was notably missing from the list of price cuts.

Data Killers Lurk in Fake Utilities

The Mac has been targeted for the first time with programs that intentionally destroy data. The offending code is in a format called a Trojan horse—an apparently normal application that causes damage when it is executed but can't reproduce itself as a virus does. At press time, three Trojan horses had been identified: Mosaic (Type APPL and Creator ????) and FontFinder (Type APPL and Creator BNBW) both erase disks; Virus Info (Type and Creator information unavailable) is less destructive. At press time HJC Software of Durham, North Carolina, and Symantec of Cupertino, California, had both announced upgrades to their antivirus utilities to deal with the Trojan horses.

Font Struggle Gets Bloodier

At the September 1989 Seybold show, Apple and Microsoft announced a swap calculated to push Adobe into royalty-free limbo: Microsoft would use Apple's new non-PostScript fonts (then called Royal, now TrueType) in MS-DOS, Windows, and OS/2, while Apple would use Microsoft's non-Adobe PostScript clone (now called TrueImage) in LaserWriters. But at the March 1990 Seybold, IBM announced plans to support Adobe PostScript on all its mainframes, minicomputers, and PCs; and Adobe announced a DOS version of Adobe Type Manager, a utility that generates high-quality screen fonts from PostScript printer fonts. At the March Seybold, Adobe president John Warnock also made good on his shell-shocked September pledge to publish the Type 1 font spec. Bottom line: end users are stuck with several competing and incompatible standards.

SuperCard 1.5 Faster than a Speeding Bullet?

Though recently acquired by Aldus, Silicon Beach Software is continuing work on its stable of products, including SuperCard. Version 1.5 is somewhat faster, adds a programming tool called Script Tracer for catching script errors, and supports hierarchical and pop-up menus, as well as list fields, which can be used to emulate the Macintosh's Standard File Dialog. Silicon Beach says that SuperCard 1.5's run-time editor is much improved, making trips back to SuperEdit less frequent, and that memory bugs are fixed. The new version will ship with a Project for converting 1.1 Projects to 1.5 format. For more information, contact Silicon Beach at 619/695-6956.

As Expected, Gassée Resigns

Ending weeks of speculation, Jean-Louis Gassée, president of Apple Products, formally announced his resignation from Apple Computer. Gassée will remain for an "orderly period of transition," according to Apple. The resignation came after Apple chairman and CEO John Scully reassigned Gassée's marketing and manufacturing responsibilities to newly appointed chief operating officer Michael Spindler. Under Gassée's guidance Apple's product-development teams created the Macintosh Plus, the SE, the SE/30, the Mac II, the IIx, the IIcx, the IIci, the Macintosh Portable, and the IIfx. Those products silenced critics who said that the Macintosh line lacked

(continues)

the power for serious applications. Recently, however, Apple has come under fire for its lack of a spiffy low-end machine as the Plus has gradually lost much of its appeal to new buyers.

Jasmine Files Chapter 11 Bankruptcy

After months of severe financial difficulties and increasing problems with customer service, Jasmine Technologies announced on March 12 that it would file for protection from its creditors under Chapter 11. The San Francisco–based company also placed 70 of its approximately 100 employees on an involuntary three-week furlough pending the arrangement of new financing. Rapid growth and heavy debt led to the company's suppliers' refusing to ship parts for its products, a Jasmine executive said (see *Conspicuous Consumer* in this issue).

Zebra or Dark Horse to Works?

The publishers of TML Pascal are preparing their first product intended for end-users. The seven-module challenger to Microsoft Works, code-named Zebra, has word processing, database, spreadsheet, charting, draw, paint, and communications capabilities. In late alpha versions, the database and spreadsheet modules were especially impressive. TML Systems says the database has the same set of formulas as FileMaker and the ability to call most of the functions in the 256-column-by-16,384-row spreadsheet, which, TML says, has the same formula set as Microsoft Excel. Zebra will have a spelling checker that works in all modules. It will also incorporate the recently announced Claris XTND technology, which simplifies importing and exporting files to and from a wide variety of applications. Pricing and the name of the product had not been established at press time. For more information, call TML Systems at 904/636-8592.

Microcom Readies Timbuktu Competitor

At press time, modem maker Microcom was planning to ship Carbon Copy/Mac in March. Carbon Copy/Mac is a utility that permits someone sitting at one Macintosh to see the screen of another Mac and to control it over a network or a modem. Carbon Copy/Mac also works over EtherTalk and Token-Ring and supports ISDN. According to Microcom, unlike Farallon's competing Timbuktu, Carbon Copy/Mac lets you resize the window of a Mac you are observing, transfer files while you monitor a second Mac, and provide a text window for sending commands to your modem. Microcom already has an MS-DOS version of Carbon Copy, but the Macintosh and DOS versions of Carbon Copy are not compatible. For more information, contact Microcom at 617/551-1000.

WriteNow Upgraded to Version 2.2

The new version of WriteNow adds features without sacrificing the program's simple interface. The dictionary has been expanded to 135,000 words for spell-checking and 1.4 million thesaurus references, and the dictionary can learn—or forget—words in batch mode. The new version adds a Go to Page command, support for multiple headers and footers in a document, and expanded Format Accelerators (WriteNow's anti–style sheets for handling batch formatting), including a summary view for displaying and changing all headers, footers, or footnotes at once. For more information, contact T/Maker at 415/962-0195.

The News from Letraset

Letraset has enhanced several of its products recently. Taking advantage of DesignStudio's open architecture, the page-layout program is adding a $125 macro language called DesignScript for automating tasks such as laying out highly structured documents and formatting text. ColorStudio is adding modules for doing color separations ($395) and for enabling service bureaus to perform device calibration (free to qualified users). ImageStudio, which also has an open architecture, has two new modules: Design Effects, a collection of new effects for manipulating gray-scale photographic images, and Halftone Preview. In addition, the company's font-creation and font-manipulation packages, FontStudio and LetraStudio, are now Type 1–compatible. Finally, Letraset slashed the charge for upgrading from ReadySetGo 4.5 to DesignStudio—from $325 down to $100. For more information, contact Letraset at 201/845-6100.

Olduvai to Brush Up GraphistPaint

The French color paint program GraphistPaint will be renamed VideoPaint and marketed again in this country by Olduvai. It was previously distributed here by defunct Draw It Again, Sam–publisher Aba Software. VideoPaint is an 8-bit color paint and image-manipulation package. It can create and render 3-D objects and do color separations, and it has an unusually adept set of masking tools. VideoPaint will list for $495, with special pricing for GraphistPaint owners. A 32-bit version of VideoPaint is also under development. For more information, contact Olduvai at 305/665-4665.

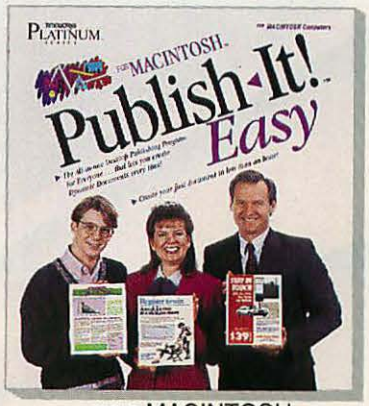
DynoDex 2.0 to Add Features, DA Access

The new version of the Mac-based address book that comes with a pocket-size notebook and laser printer paper to fit will soon have a desk accessory for reading and adding data; a large notes field; and many more printing formats, including letters, envelopes, and labels. The new DynoDex will also have more database functions, among them tools for eliminating duplicate records. Portfolio Systems is also developing a calendar utility and a third personal-information-management tool—all of which will be able to share the same data. For more information, call Portfolio Systems at 718/935-9501. ◻

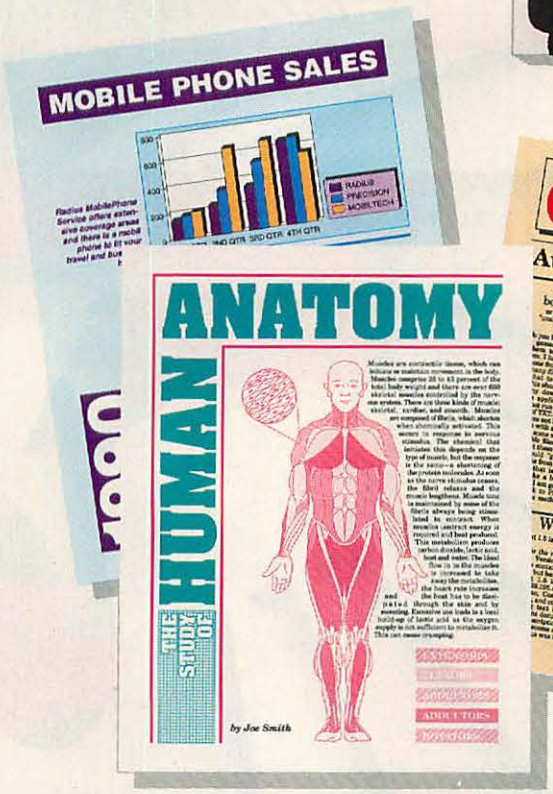
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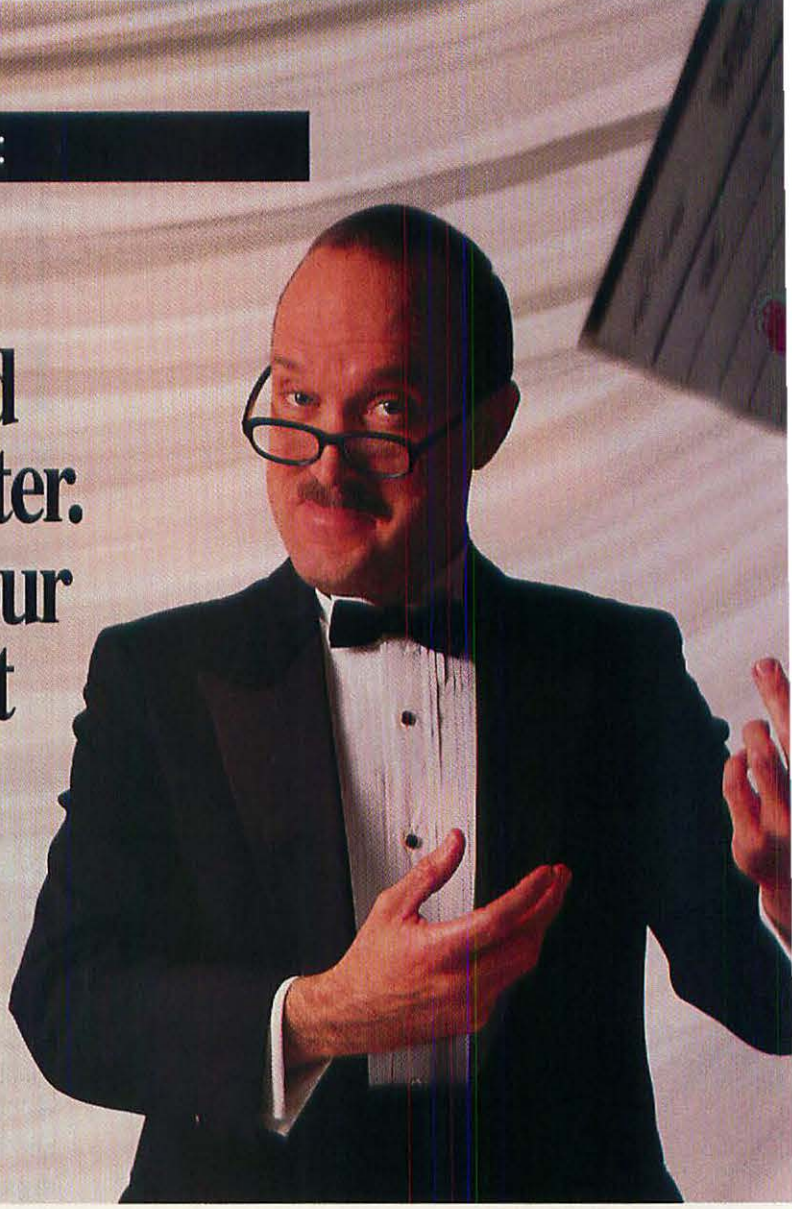
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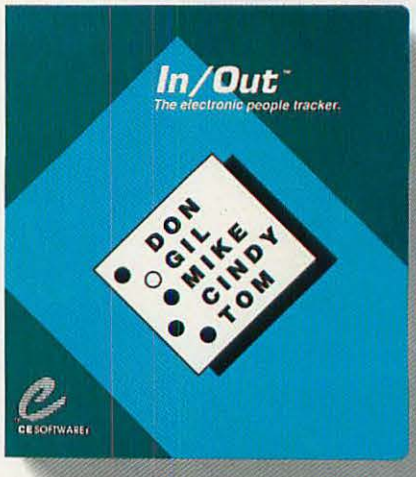
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The Macintosh IIfx

Is it revolutionary? Is it news? Or is it something else?

BY JERRY BORRELL

The trouble with the media is that it seems unable to distinguish between the end of the world and a bicycle accident. — George Bernard Shaw (paraphrased)

The new Mac IIfx is a good machine, possibly a great machine. And the Macintosh Display Card 8•24 GC, the 24-bit video board announced at the same time, has put Apple at the top of the performance heap of personal computer manufacturers. Compaq, Tandy, Wyse, even IBM have machines that rate better when tested against esoteric benchmarks, but the IIfx performs superbly when run with programs that can take advantage of its performance (such as large desktop publishing files, graphics applications, databases). I was able to open a large PageMaker file (including 8-bit images) and drag the page around the screen with no screen-drawing delays. Sorry, Jean-Louis, it drives like a German car, not a Honda.

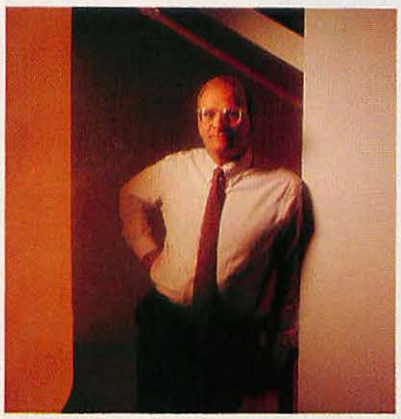
What makes reporting on the IIfx difficult is that it is so flawless in its execution and so logical an extension of current machines that it is startling. Okay, I don't like putting three to six times more performance in a Mac II chassis (a IIcx box makes more sense to me), but that's hardly a legitimate complaint. In fact, it's a benefit if you own a Mac II or a Mac IIx and would like to upgrade to the latest and greatest machine, because logic-board upgrades will be made available.

The manufacturing prowess represented by the new machine is considerable, and the evolution of Macintosh system architecture is admirable. Apple uses two-sided surface mounting for components, and under the chassis you'll find 6-layer printed circuit boards and nine relatively complex semicustom chips that integrate many functions. There are a 40MHz processor and a coprocessor, plus two additional processors to handle input and output functions. This overall performance improvement continues the inexorable progress Apple has made since introducing the Mac 128K.

So the IIfx is not the end of the world, or even the start of a new world. It is a meaningful step along the path to future Macs. The only question is whether you or I will write out a check for the $10,000 to $12,000 the IIfx will cost. Discounts of up to 30 percent for large corporations will insure that they will buy the machine, but most Macs now are individually owned.

The Winter of Apple's Discontent

It was a cold winter for Apple. Xerox announced its lawsuit for (among other things) theft of intellectual property. Then, as the days shortened, Apple's PR machinery quietly began to send out advance notice that the company's plans for a low-cost Mac had changed. Not official notice, mind you, but "this is not for attribution or quotation" kind of discussions. At about the same time in January, John Sculley abandoned two keynote speeches at important industry-analyst meetings—his favorite kind of appearance. Also at about the same time, Apple stock took a dive as a result of lowered profit (but not earning) expectations. Journalists and pundits nationwide were in high dudgeon about Apple getting its comeuppance. "Apple has forgotten the masses, its roots" read the average porridge passing for meaningful commentary.



The company's annual Christmas gift to employees (in 1988 it had been a combination portable beer cooler and radio) was dropped. Instead, Apple donated $50,000 to UNICEF.

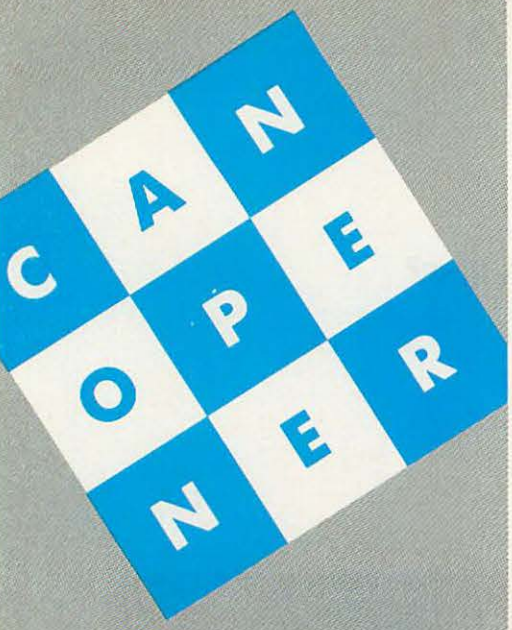
Then the foo really hit the fan. John Sculley wrote a letter to employees laying down the law. Times were tight in Cupertino. Apple's second quarter—traditionally its largest and most profitable—was flat, and the following quarter boded not so well. Some of Apple's 14,000 employees would be laid off in the first large-scale layoffs since 1985. The company's vaunted profit-sharing plan would be changed. The program under which Mercedes, Audis, and BMWs were provided to executives was axed. A hiring freeze went into effect.

The T-shirt budgets were cut.

One wag in Cupertino suggested to me that the layoffs might not be

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noticed, "like the fact that we didn't do any marketing for six months in 1989 wasn't noticed. And guess what. The computers still sold."

New COO Michael Spindler promised (a promise later hedged) an imminent change in the Apple warranty program. And a low-cost machine seemed to retreat from peoples' consciousness at Apple.

Whither the Low-Cost Mac?

Sometime between the 1988/89 winter announcements by Sculley to the effect that a low-cost design center was coming and the summer of '89, some assumptions shifted. The change sparked, one assumes, by planning in Apple's product marketing and development group. So now there's talk about *two* low-cost machines.

Does $799 constitute a low cost machine?

One Apple insider asked me, "Have you priced a Mac Plus lately?" And he's right: during the Christmas holidays, advertisements for a Plus offered prices as low as $799. But I'm not willing to let Apple off the hook for a low-cost machine should it cleverly position the Plus. Any low-cost machine should include, at a minimum, the direct-connect slot of the Mac SE, color capability, and updates to the logic board. Would an SE priced at under $1000 constitute a low-cost Mac? The answer is yes. It wouldn't be a modular machine like an Apple IIGS that allows users to expand and upgrade the system easily. But it would satisfy the continued demands for a low-cost machine. Perhaps we'll see such a model eventually.

But color, or so informed sources say, will be available in a low-cost machine as well, in a package that will look like a Mac IIcx and be priced at about $2500, including a 13-inch color monitor. And this machine will be expandable through its slots.

For all of our (users', the press's, and analysts') whining about the need for a low-cost Mac, Apple still has the unenviable task of reconciling what the multitude cries out for and what the company can produce, at what margin, that will represent more technological value for the end user and that will be a competitive machine in the marketplace. The amazing truth is that Apple has been working hard to build this machine for more than a year.

System 7.0—A Good Call

The low-cost Mac was not the only thing in for dramatic change. Throughout the fall and winter of 1989, key development staff at companies like Microsoft and Aldus could be heard thumping their fists down on tables and cursing about problems with converting their applications to Apple's new system software.

Then Apple made a decision to bite the bullet and change the release of System 7.0 so that it would incorporate a somewhat reduced feature set from the originally announced plan. (The trade press had a field day with that.) Once the commotion of midwinter dissipated, it was clear that the company had made a good decision. Apple settled on five key elements for 7.0—vital features that would cause developers the least upset. They included: virtual memory (which can be used on any Mac with a 68020 and an MMU or PMMU, or with a 68030 processor), IAC/IPC application protocols, font rendering, database access, and a new Finder.

There were a lot of trade-offs in the decision. Apple clearly couldn't manage to get functions such as the new print manager and layout manager into this release, much to the pleasure of its third-party developers, who didn't look forward to the great deal of work necessary to implement them. Apple had to make the decision about naming conventions—and bit the bullet again in deciding that some features planned for 7.0 would now be included in a new version to be named 8.0.

On the good side, several new features not mentioned earlier were planned for inclusion—a new help manager, sound manager, time manager, and a host of functionality brought about as Apple finishes the IAC/IPC portions of its system code. These functions include Personal Ap-

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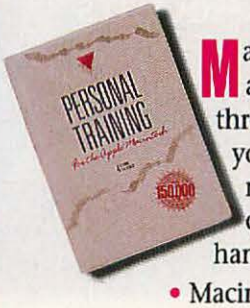
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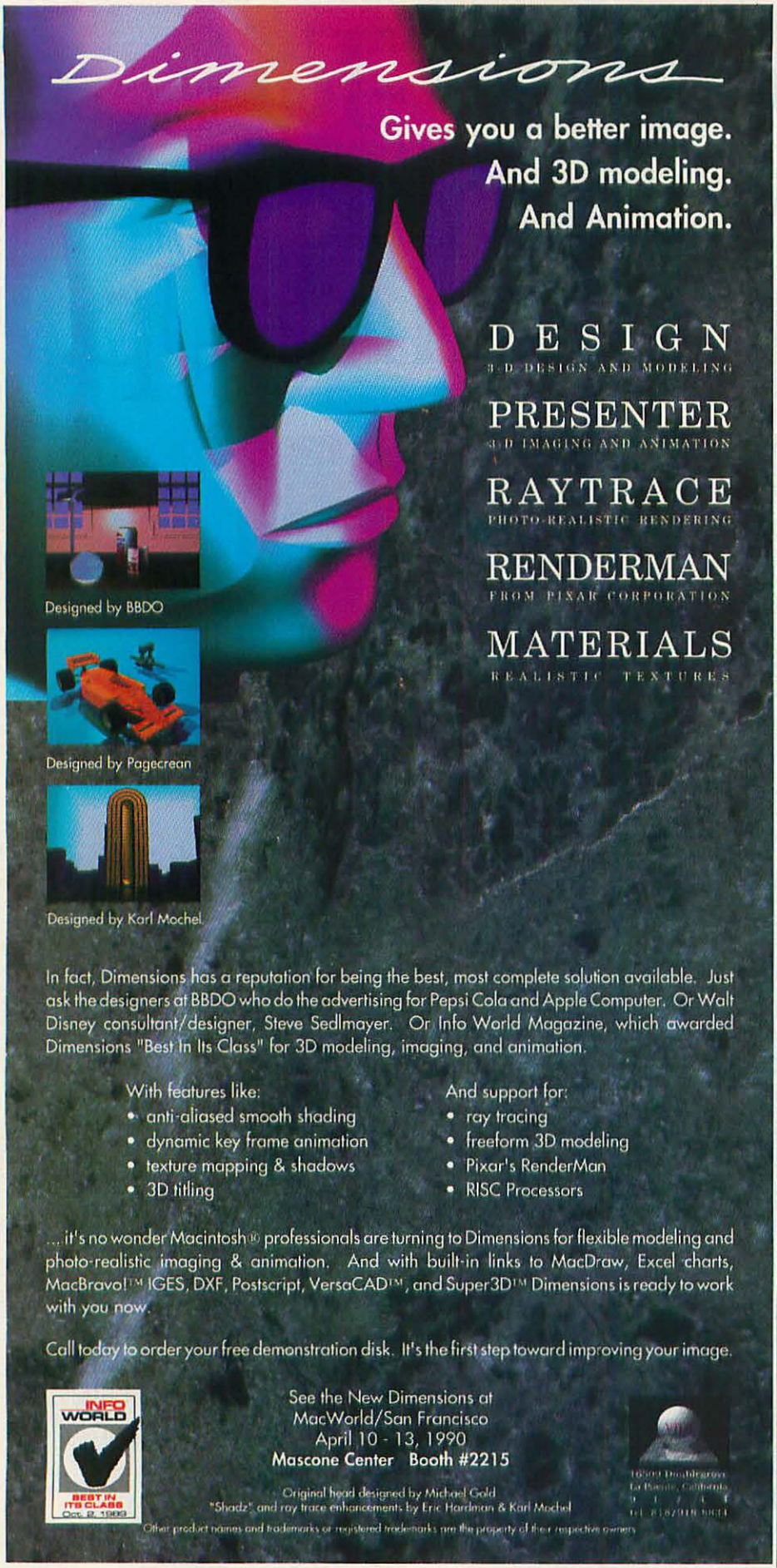
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pleShare and the ability, for the first time, to have networks run mixed operating systems at the same time (6.0 and 7.0, for example) without crashing network resources, such as file servers, or requiring that a printer on a mixed network be reinitialized by different versions of the operating system.

I used a prerelease version of System 7.0 on a Mac SE with 2MB of RAM and an 8MB partition on a hard disk. I opened eight separate windows, keeping MacDraw, MacWrite II, Claris CAD, Excel, 4th Dimension, and three other applications open at once. Not bad. There were really fast interactions with whatever window I chose to activate.

System software 7.0 will give rise to new types of application

It remains to be seen what will happen with large graphics files, but text-based applications run smoothly.

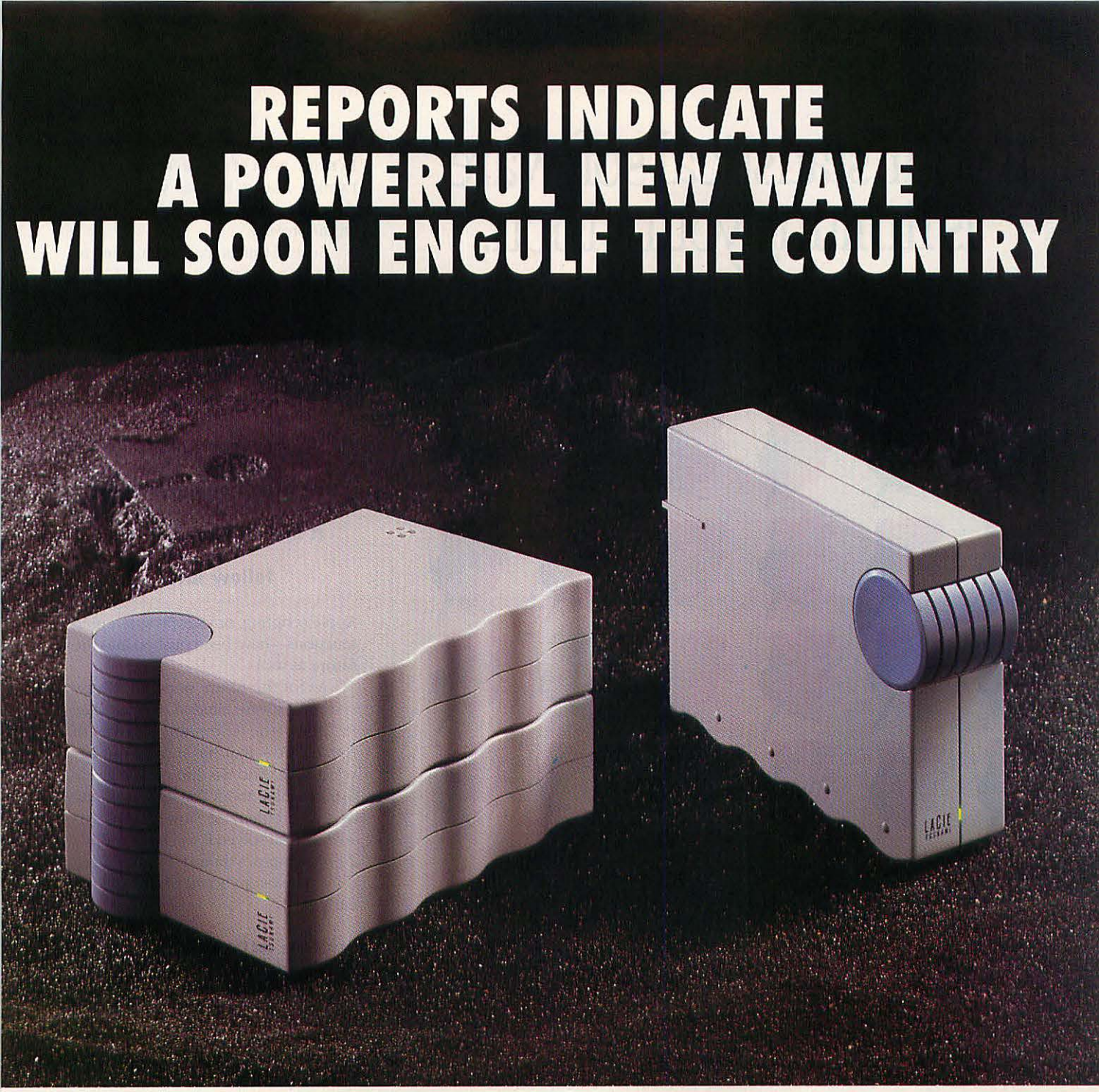
More exciting is the new type of application interactions that developers will be able to accomplish. For example, I was able to have PowerPoint open on three different machines while three people viewed and worked on the same slide presentation simultaneously—the result of the new database-access and file-sharing features established on each machine. And there is no problem with speed if the software is implemented correctly by the third-party developers.

The Shift to 8.0

Perhaps the strangest thing to report is the internal Apple debate that surrounded the decision to shift some of the functions originally intended for 7.0 to an 8.0 version. For a while there was a suggestion by many that an interim version called 7.5 be released, but Jean-Louis Gassée made the call that this was verboten—too confusing to the user and to retail channels. The foot-dragging appears to have had its basis in fear. Fear that postponing some features would reflect badly

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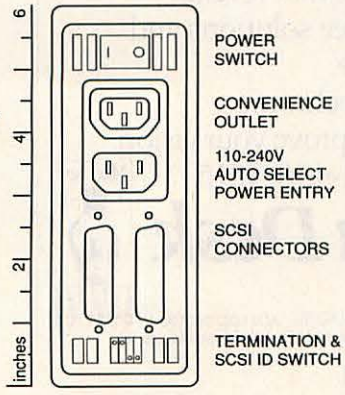
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upon the technology group at Apple. In truth, most of us don't give a flying twinkie just as long as we perceive that the operating system is continually improving.

Several things that aren't going to make it into System 7.0 will follow later in the year. The new layout manager was ready, but it made no sense to ship that without the print manager. Nor will the script manager appear. A different set of functions—

Several things that aren't going to make it into System 7.0 will follow later

Apple scripting, or user programming functions—have been pushed into the future as well.

As for the future non-QuickDraw system software alluded to by Sculley in 1989—the complete rewrite of Apple's OS—that has moved out beyond 1992. And we don't really give a flying twinkie about that either, as long as the problem of slow graphics is solved. And solved it will be as today's 24-bit graphics board is integrated onto the system board of late 1990 or early 1991.

Next, Adobe, and Cannon

The question on many minds over the winter was what in Sam Hill Steve Jobs intends to do. Everyone and his pundit knows that Steve is working away on a color version of his Next machine. (Someone please ask Steve to stoop to the mundane and make a floppy drive for the thing.)

Given the fact that Apple drove Adobe into Steve's camp, and the fact of Canon's investment in the company, it should not come as a surprise when Steve announces his new strategy of revolutionizing the office based on a color computer, a plain-paper color copier, and color software. And, in fact, 6 pages per minute that contain 24-bit color images is going to be dramatic.

I can see the headlines now: Jobs announces color is the Next wave. Future of the office explored. Bicycle accident in Menlo Park. M

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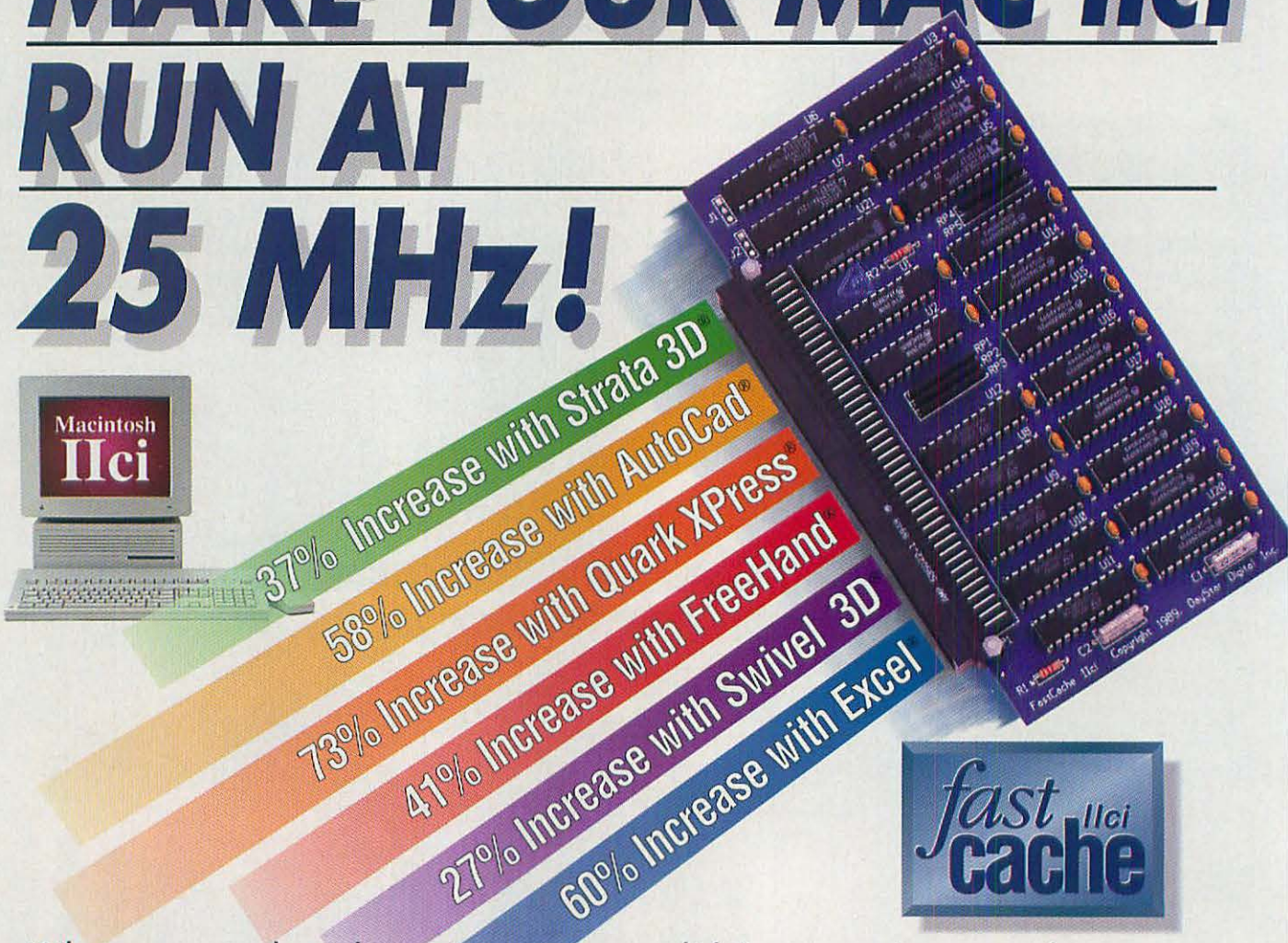
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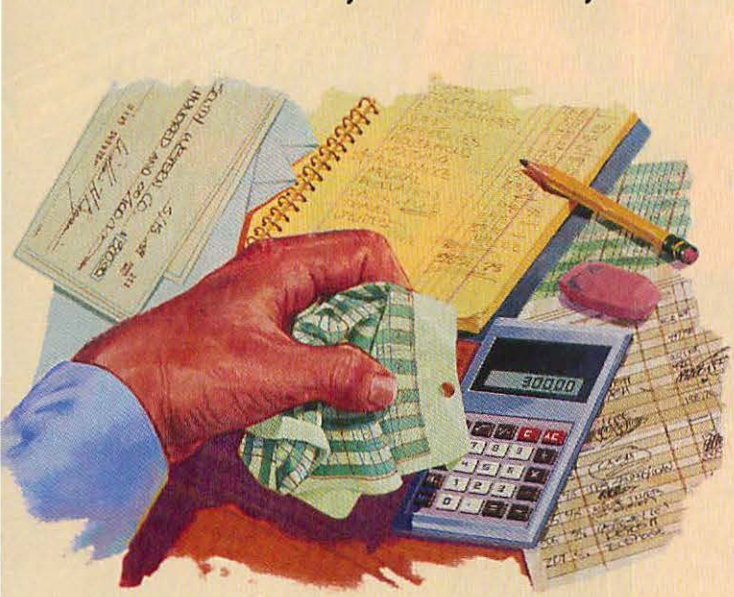
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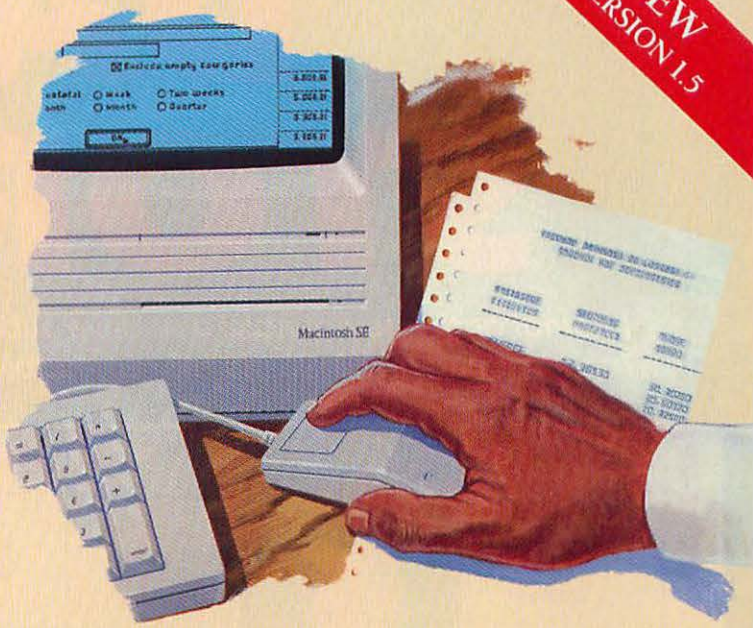
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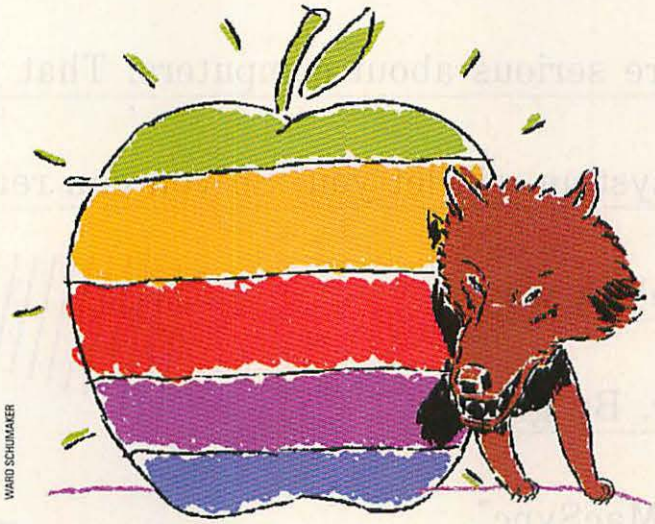
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LETTERS



Feeling the Bite

I have been a certified Apple developer for two years. Your *Conspicuous Consumer* column of December 1989 was right on target about an insane problem I can't believe Apple is putting me through.

In March 1989 I had an Internal 80SC Hard Disk installed in my SE. In September it suffered intermittent boot-up failures and I brought it in to ComputerLand. On the technicians' advice, I called Apple to request a warranty extension and was instructed to take the system to an Apple Service Center.

When the service manager told me that the drive needed to be repaired at a cost of $450, I asked him to call Apple for a warranty extension, which he did, and Apple declined. When I called Apple, I was told that it was the service manager's responsibility to contact the engineers' Technical Support Hotline for a free repair. He complied, but once again, the request was denied. Finally, I paid for the repair and called my lawyer, who said that under the rules of U.C.C., a latent defect is not to be absorbed by the consumer, whatever the specific warranties, especially when such warranties are not industry standard. Neither of us knew then that my drive was still under warranty by Quantum (the manufacturer) and that Apple would use this warranty to replace the drive—without passing the savings on to me. When I read your column I was really shocked. It was like seeing the teeth of the wolf under your granny's night bonnet.

Apple informed me that by authorizing the repair job, I had nullified my options for a warranty extension! I was also told that Apple sometimes makes good on the Quantum warranty where it is applicable, but in my case (accepting the repair from the Apple Repair Service Center) it was not applicable.

Since $450 is not worth the expense of a lawsuit, by putting me off, Apple has won. If you publish this letter along with my address (102 Whisperwood Ln., Rehoboth, DE 19971), maybe others with similar problems would join me in a class action.

Xavier François Hussenet
Black Banana, Inc.
Rehoboth, Delaware

At press time, Apple announced that it would extend all product warranties to one year, retroactive to January 1, 1990. For more details see *MacBulletin*, page 17. —Ed.

The Radiation Question

I'd like to clarify some points made in the article by Diana Hembree, "Warning: Computing Can Be Hazardous to Your Health" (January 1990). The Kaiser longitudinal perusal of data is a correlation study. Correlations are not cause-and-effect relationships. They do sometimes indicate a problem that could be further studied. This was done with the Kaiser data, and no cause-and-effect relationship was found.

The Kaiser and the Brodeur literature are unscientific ramblings of people who have an axe to grind. When their findings were presented for peer review, they fell into the area of wishful thinking, rather than scientific research. For a scientific interpretation of the radiation question, I suggest that you either read the newsletter *Access to Energy* (Box 2298, Boulder, CO 80306) or contact directly Dr. Petr Beckmann, professor emeritus of electrical engineering, University of Colorado. Both the radiation and power-line controversies have been covered in Dr. Beckmann's newsletters.

Mr. Brodeur and other scare-mongers are on record as being antiscience, *(continues)*

Corrections

*The correct phone number for Deneba Software (*New Products, *March 1990) is 305/594-6965. Deneba's upgrade policy for Canvas 2.1 (*Updates, *March 1990) is $30 for users who purchased Canvas before August 1, 1989, and free to those who purchased it after that date.*

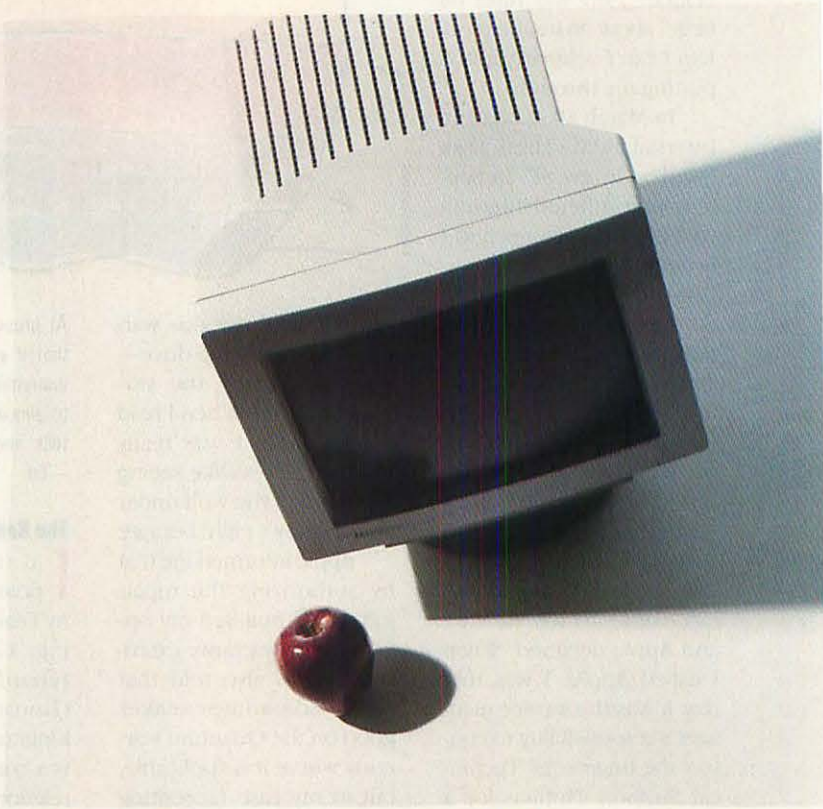
The phone number for Heizer Software, maker of Excel, Works, and HyperCard tutorials ("Mastering the Mac," February 1990), is 800/888-7667.

The Racet Cosmos 600 requires 632 seconds for a 20MB folder transfer ("Erasable Opticals: New Light on Data," March 1990). The bar showing its timing was left out of the 20MB Transfer chart on page 157.

It syncs to

The fact that you own or are considering a Macintosh II, IIx, IIcx or SE/30 shows you're serious about computers. That you want to reach as far as a great system will let you. So you can reach your potential.

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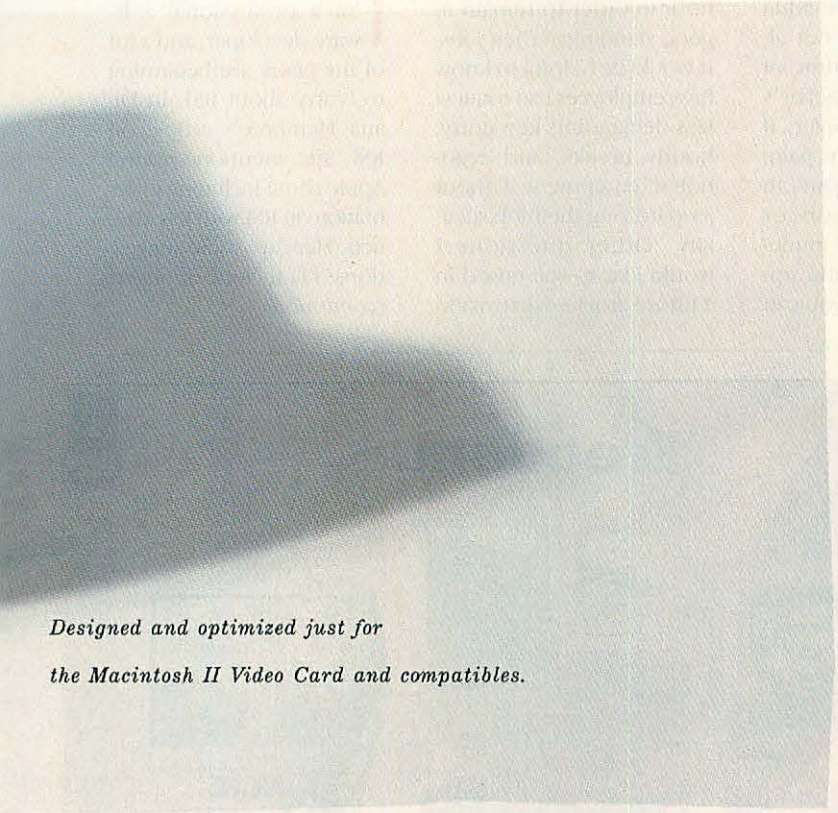
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fatigue. Plus a smaller footprint and a tilt-swivel base, for more comfortable viewing. What's more, we give you a cabinet that looks as good from the back as it does from the front. As well as a HyperCard stack on-screen user reference guide called Valet.™



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NEC

antitechnology, and mainly, anti–free enterprise. The radiation question is a scientific, technological question, not a political one—it can be solved, only by technology.

Frederick A. Ford
Saint Luc, Quebec, Canada

The Kaiser study, conducted by highly reputable scientists, was an epidemiological study that found a statistically significant correlation between heavy VDT use and an elevated risk of miscarriages. As our article made clear, the Kaiser researchers stated that the study did not determine what caused the miscarriages. As for journalist Paul Brodeur, many points he raised in his New Yorker series on electromagnetic radiation were echoed in the Office of Technology Assessment's recent report on the possible risks of human exposure to electromagnetic fields.—Ed.

Don't Ignore RSI Warning Signs

As an RSI (repetitive strain injury) sufferer, I would like to add a few more points for VDT users to remember. As stated in your article ("Warning: Computing Can Be Hazardous to Your Health," January 1990), "seek medical treatment from a specialist at the first sign of RSI." Since pain in the beginning stages can be intermittent, it's easy to procrastinate and not seek medical attention. In addition, the pain may not always occur at the time of the scheduled doctor's appointment. However, if you experience any pain, you should seek out an orthopedic surgeon or hand-wrist specialist immediately and keep the appointment. Before you can collect workers' compensation, you must have sought a physician's advice and have a documented history of the specific problem.

The article also recommends that keyboard operators not exceed 1700 words per hour. In all my years of typesetting and desktop publishing, I would never have been able to keep a job typing at this slow rate. Many desktop publishers I know must type at least 6000 words per hour in order to remain in good standing in their jobs. It would be helpful to know how employees can request less-demanding key entry, hourly breaks, and ergonomic equipment without jeopardizing their job security. Other questions I would like to see raised in a future article: what workers' compensation information must employers provide to employees? How many women have experienced RSI during and after pregnancy? Is there a greater risk of developing RSI from using a three-button mouse? Are there any VDT users' rights groups distributing information on these workplace hazards?

Cynthia L. Seinar
Oxford, Michigan

Apple and RSI

I'm a professional software developer, and a lot of my peers are beginning to worry about RSI. In Diana Hembree's article on RSI, she mentions asking Apple about including information on RSI with its products. Here are some suggestions: (1) include an insert

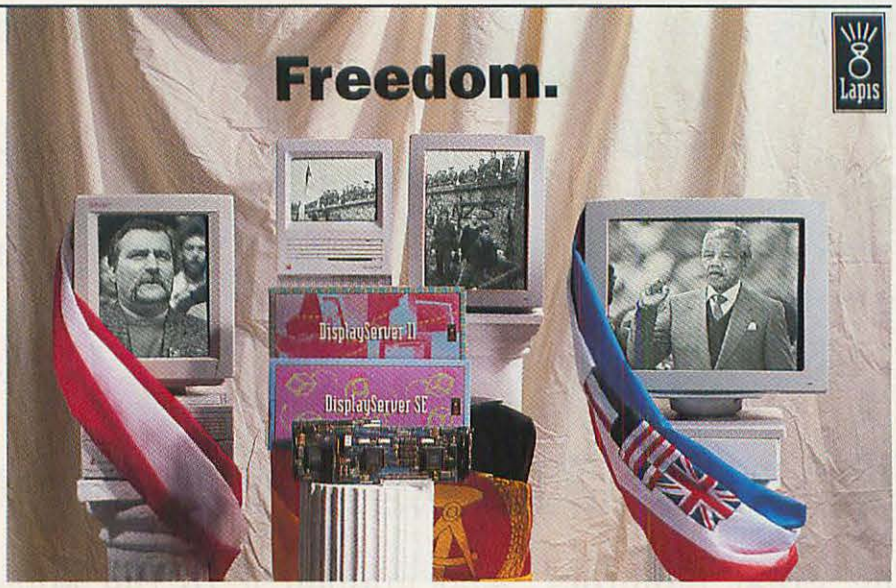
(continues)

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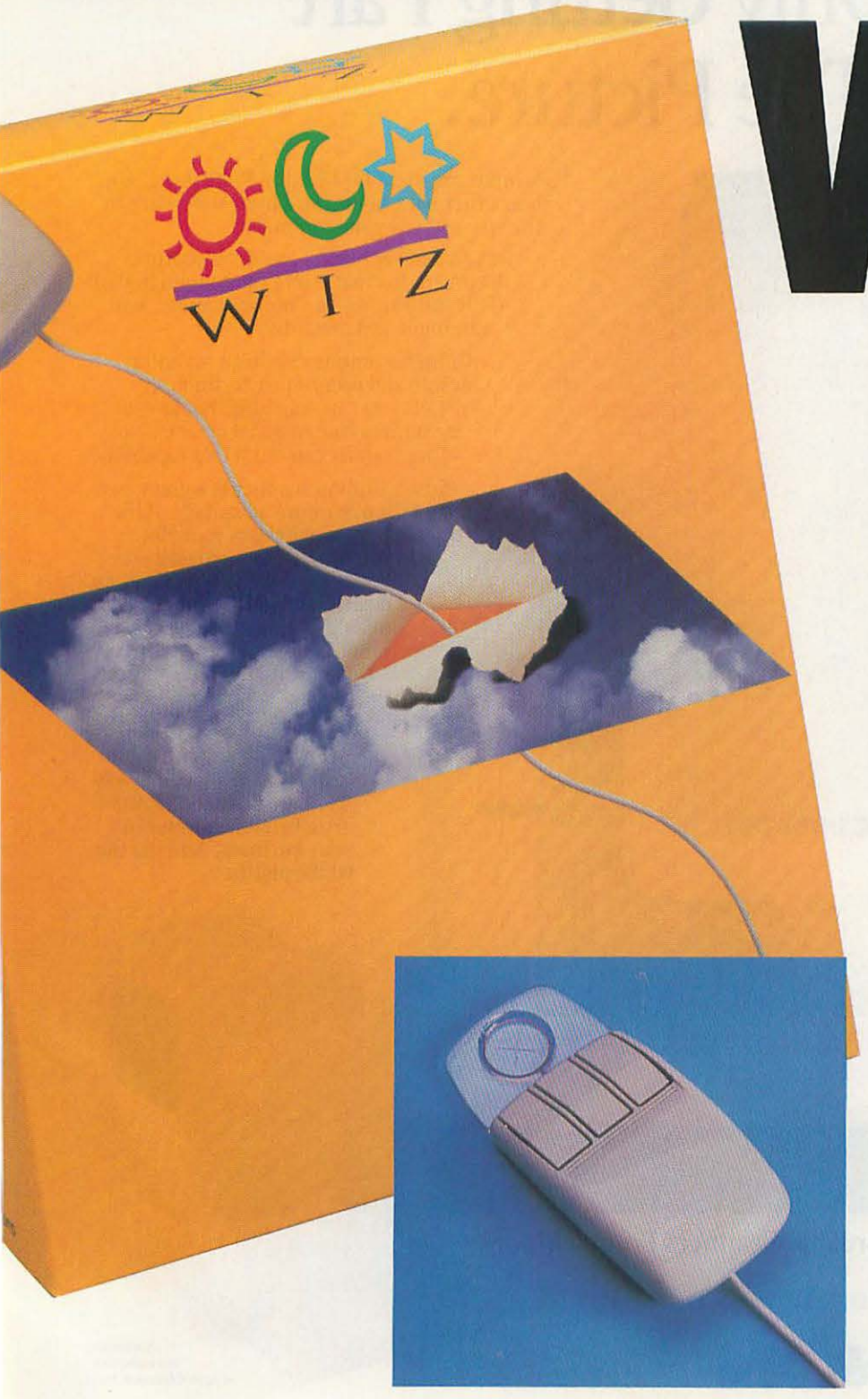
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INTRODUCING WIZ



WIZ is an exciting new productivity tool. It combines the easy-to-use features of a mouse with the power of an intelligent graphics pad to enhance every pointing, tracing and drawing function you do.

And it gives most Mac and PC users a short cut through tedious keystrokes and menu picking steps. So it's easier for new computer users to learn both the system and the software. While experienced users immediately become more productive, powerful and creative.

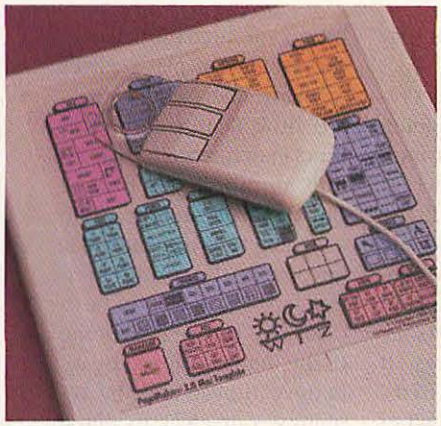
But the most amazing thing about WIZ is that you get it all for a suggested retail price of under $250.

Features/Benefits

6 programmable functions. The three WIZ mouse rocker buttons allow you the flexibility and convenience to program up to four different commands or macros. Two others control your mouse and template clicks.

Speed. WIZ eliminates the need for scrolling through multiple on-screen menus or remembering the many keyboard commands used by software packages. Programmable buttons and templates allow instant access to commonly used software commands.

Pinpoint accuracy. WIZ is the most accurate mouse system on the market, with 1000 dots per inch (dpi) resolution, compared to as much as 400 dpi offered by other mouse manufacturers. The very high accuracy of the pad, combined with the cross-



hairs on the mouse and the optional pen, make WIZ excellent for drawing and tracing.

Reliable. WIZ has no mechanical parts. It is all electronic, so there are no parts to clean or maintain. No rolling ball or moving parts on the mouse. WIZ is the most reliable system you can get.

Adjustable pad scaling. WIZ allows you to define the portion of your intelligent pad's active area which corresponds to your computer screen. This is especially beneficial in drawing and tracing applications.

Templates offer direct access to commands. Optional templates, available for most major programs, fit on top of your intelligent pad. The color-coded WIZ templates place software commands at your fingertips, eliminating tedious pull-down menus and keystrokes.

Software compatibility. Works with most of the popular mouse-driven software. Full Microsoft and Apple mouse compatibility.

Small footprint. It's the same size as an ordinary mouse and pad. 7.5″ square active area. The overall size is 9.5″ x 11.8″.

Easy to install. Works on IBM and compatibles plus Macintosh II and SE computers. WIZ plugs right into your mouse, serial port or ADB, (depending on your system). You're up and running in just a few minutes.

Complete system. WIZ comes complete with a WIZ mouse and intelligent pad, interface cables, drivers, operating system template, User's Guide and a 5-year warranty.

Support. WIZ is manufactured by CalComp, a world leader in computer graphics for over 30 years.

Who can use WIZ?

Anyone who is now using a mouse or thinking about using one including:

Business professionals can use WIZ with all their applications to help save time when creating presentations and business forms, including spreadsheets and graphics.

Graphic artists can use WIZ to assist with the creation of simple to sophisticated designs and graphics.

Electronic publishers, both professional and occasional, can use WIZ to help speed the creation of a variety of professional-looking documents such as newsletters, flyers, pamphlets and stationery.

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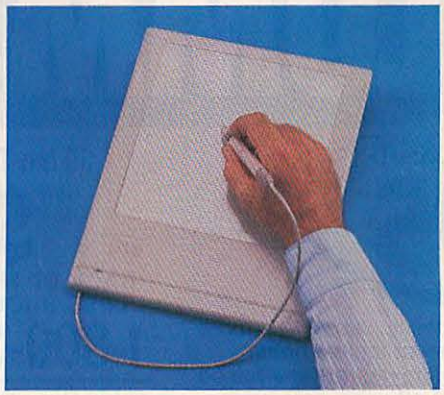
Options

WIZ Pen

Creative alternative. When you prefer the feel of a pen over a mouse. It's great for menu-picking, drawing and tracing, as well as controlling screen cursor movements. Plugs right into the back of your pad.

2 Buttons. Use the button in the tip to menu pick, draw and trace – can use for all your mouse functions too. The side button allows you to make template command selections.

Suggested retail price of $75



WIZ Software Application Templates

Enhance productivity. When you want speed and power, use the WIZ mouse or pen and intelligent pad with a template. WIZ comes with a standard template for your computer's operating system. Plus there's a variety of optional templates for the most popular software packages, which makes using packages quick and easy.

Easy to use. The color-coded templates come complete with easy to install software and instructions.

Templates

Over 35 optional software templates are available for most IBM and Apple packages, including:

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See WIZ today at your local computer store or dealer.

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WIZ

By CalComp

Everything else is just a mouse!

with all CPUs and keyboards that summarizes hazards of computer use and lists resources for further information; (2) work with, say, Consumers' Union to evaluate office equipment from an ergonomic viewpoint and urge customers to consider this as part of their computer purchase; (3) urge large dealers to stock good office equipment, and urge small dealers to give referrals (if their users become disabled, they won't be lining up to buy the next Mac); (4) get third-party research labs to investigate mouse and keyboard designs and publish the results.

Mike Morton
Honolulu, Hawaii

A Designer's Viewpoint

As an industrial designer with a major computer hardware manufacturer, I applaud your article, "Warning: Computing Can Be Hazardous to Your Health," but I ask that you do not print irresponsible stabs at the design professions in the style of Andy Rooney. There has been no shortage of proposals and designs for better computer equipment by industrial designers, human-factors engineers, and mechanical engineers in our industry. However, these designs rarely see the light of day because management and marketing are loath to produce or promote products that they see no demand for. Ultimately, the very best designs cannot be produced unless the user populations let the computer industry know that ergonomically poor products will not be tolerated. So please speak up, because we want better equipment just as much as you do!

Tony Hodges's sexist remark about men designing the products that women use shows his ignorance of the number of women in the design professions and the amount of time that designers and engineers now spend at keyboards and tablets using their CAD systems. If he'd like to make it up to us, I would accept, on behalf of my profession, one of his keyboards (because, boy, do my wrists ache now).

Peter S. MacDonald
Reading, Massachusetts

Strains of Music and Computing

The intricacies of computing have often been likened to the structures and cadences of music. Unfortunately, the problems that have confronted musicians—shortening the playing lives of many fine performers—are now facing computer users in dramatically increasing numbers. Whether caused by playing the violin or typing feverishly at a Mac keyboard, the problem is much the same. In both cases, we can reduce some of the injuries caused by repetitive movements by retraining ourselves to eliminate the tension patterns that develop out of these activities. If we focus solely on the tools as the problem, we will never overcome these debilitating injuries.

Jerry Sontag
San Francisco, California

ATM and the ImageWriter

Luis Camus and Erfert Fenton's review of Adobe

(continues)

Macworld says,
"...a fine unit at an attractive price."
--Macworld
December 1989

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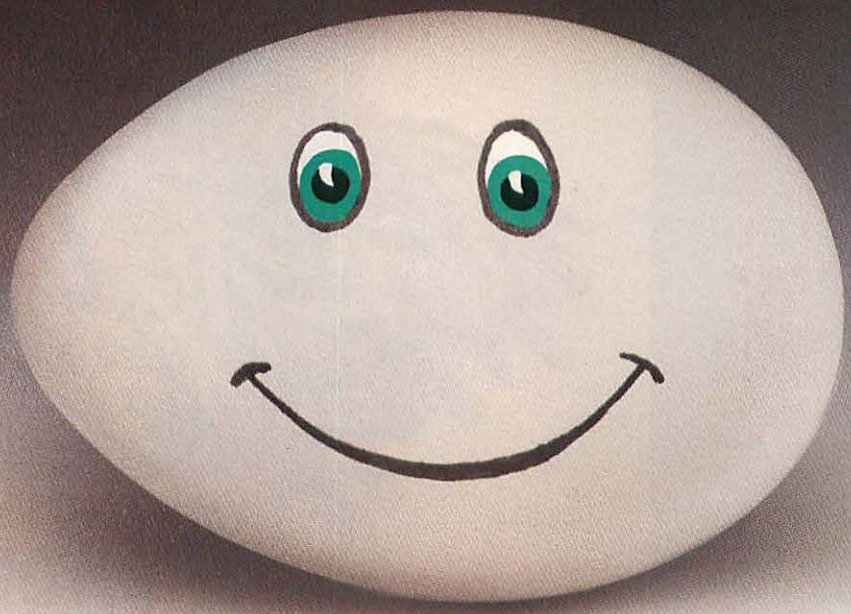
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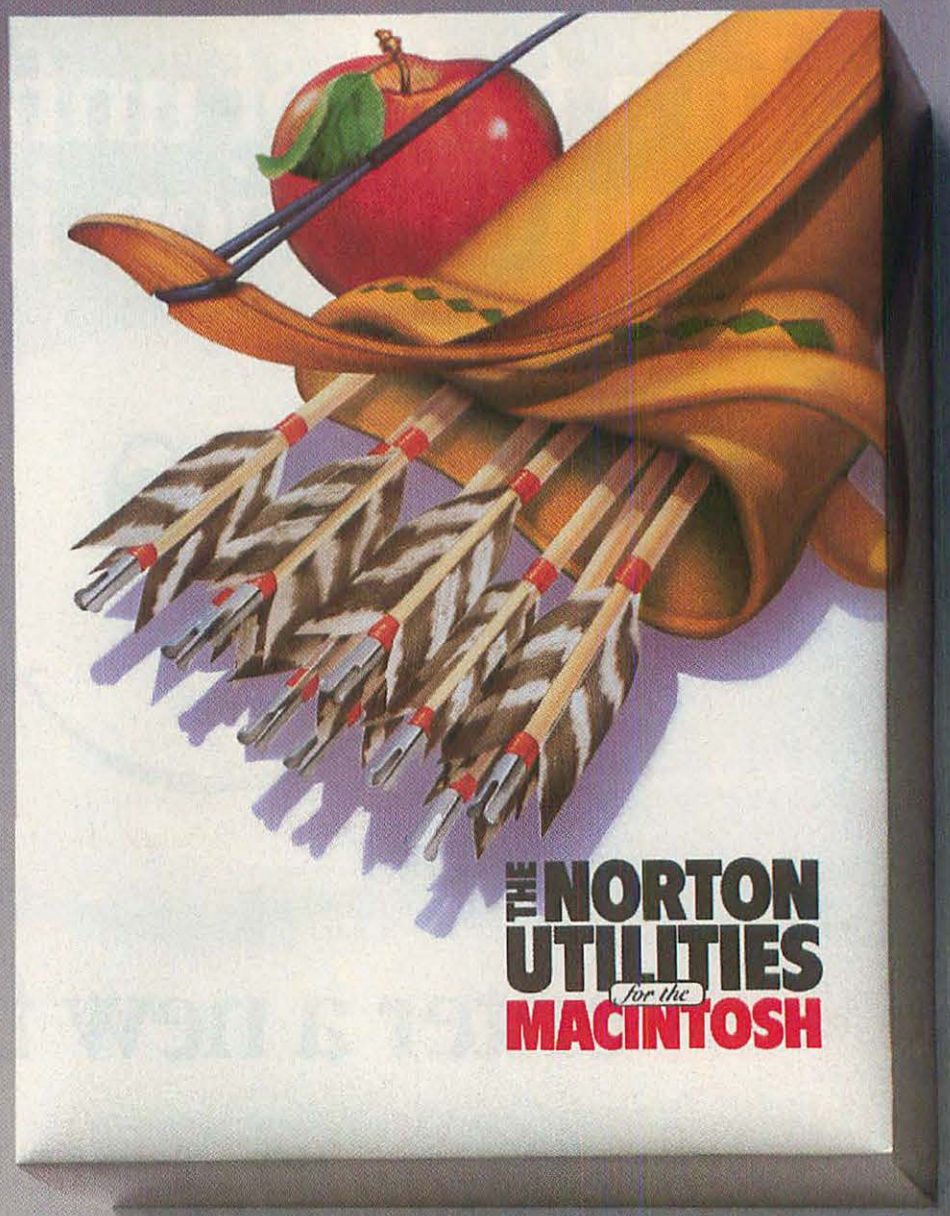


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If that sounds like an outrageous statement, it sure is.

But then, this is one outrageous set of utilities.

In fact, comparing the Norton Utilities® for the Macintosh® to anybody else's utilities for the Macintosh is, well, kind of embarrassing.

Because when it comes to fixing your disk problems, rescuing your data and daily getting the utmost from your Mac,® nobody else even comes close.

Why you need a Doctor in the house.

To see what we mean, see what happens when you call up our revolutionary *Norton Disk Doctor.*®

Which is what you'll do whenever you're having trouble doing things like booting your system, recognizing or reading disks, opening, closing or trashing folders, locating icons or launching applications.

Instead of displaying something like "Sorry, unable to repair" and sending you to the service center, the Disk Doctor determines the exact nature of the problem, reports it and, in most cases, fixes it for you.

All by itself.

In fact, the Disk Doctor automatically diagnoses and repairs the 45 most common—and dangerous—problems your disk can confront you with.

Including a whole bunch of things the other guys can't even detect, let alone repair.

Which is one reason why—unlike other programs—we don't display hair-raising messages warning you of the "Risk of losing data" from using our utilities.

We save your trash.

Of course, any time a human being uses a computer—yes, even a Mac—there's a risk of losing data.

Which is why, seven years ago, Peter Norton Computing invented the legendary *UnErase.*®

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Instead of just one level of data recovery, we give you three.

You can UnErase by File Type.

We rebuild your reformatted hard disk in a mere nine seconds. That's 52 times faster than the "competition."*

**Total times to recover a reformatted 40MB Quantum* internal hard drive on a Macintosh IIcx with respective volume information files installed.*

Any resemblance to other Macintosh utilities is pure coincidence.

By Text Search. Or use *Quick UnErase* to scan your fully loaded hard drive in as little as five seconds.

(You don't even want to know how long it takes everybody else.)

Whether your drive is fully loaded or nearly empty, *Speed Disk*™ is—here we go again—the quickest, easiest and safest way to dramatically accelerate disk access.

And unlike other programs, Speed Disk won't lose your data even if your Mac loses power.

Speaking of losing data, when it comes to losing large quantities of it quickly, nothing compares with accidentally reformatting your hard disk.

And when it comes to unformatting your hard disk, nothing compares with our *Format Recover* and *FileSaver.*



Together they not only let you resurrect 100% of your data, they do it in a tiny fraction of the time it takes other programs.

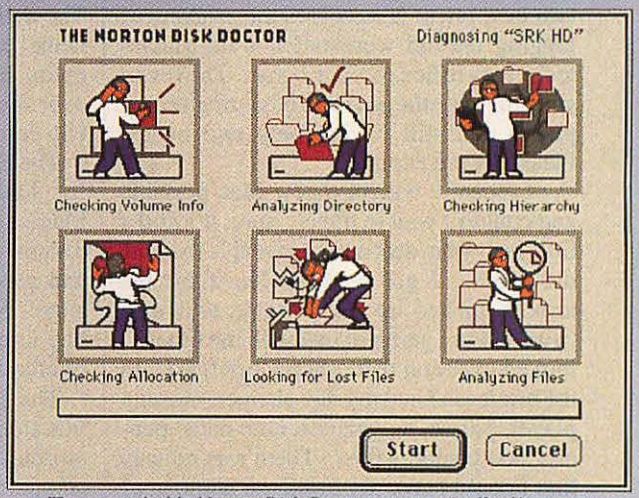
What a find.

Of course, you don't have to lose your data to want to get at it as quickly as possible.

That's something you want to do every day, every time you open a file.

So you'll be interested to know that *Fast Find* locates and opens files so quickly, you may never use the Mac's standard Find File desk accessory again.

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The remarkable Norton Disk Doctor automatically diagnoses, reports and repairs the 45 most common—and dangerous—disk problems. It even tells you when it's time to run our Speed Disk utility and optimize your Mac's performance.

If all of this looks too good to be true, see your favorite software dealer for a demonstration.

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We'll send you more information.

Peter Norton COMPUTING

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Macintosh Portable Owners!

How to Carry your Briefcase, a Garment Bag, your Macintosh Portable, and still BEAT THE 2 ITEM CARRY-ON LIMIT



1988



1989



1990

If you just bought a Macintosh Portable you've **solved one problem** and **created two new ones.** You solved the problem of lugging the old workstation-style Macintosh from office to your home. However, you still have the problem of getting on airplanes and still having only two hands. Please let me explain.

I recently bought a new Mac portable and couldn't wait to travel. Sure, it's still a little heavy but a lot more moveable than the old Macs. I got ready to leave for the airport, picked up the portable with one hand and my garment bag with the other. I looked over and there sat my briefcase. In the briefcase I had my day planner, cassette player, phone, magazines, note pads, pencils, and business files. There was no way that I could leave my briefcase home yet I seemed to have run out of hands!

The solution was to put my briefcase under my right arm, grab the portable with my right hand and pick up the suit case with my left. Not comfortable, convenient, or easy to do, but I at least made it to the airport.

At the gate I ran into problem number two. Even though I had found a way to carry all three cases they wouldn't let me bring more than two carry-on's onto the plane. All I could do was send the garment bag off with a baggage man and hope that it didn't end up in garment bag heaven. As I got off the plane I carried my Mac and my briefcase to the baggage claim area only to find good news and bad news. The good news was that my bag had arrived, the bad news was that it had been run over by a truck.

Happily I want to announce a solution to this problem. If you own a Portable Macintosh you need the EXECUbrief Saddlebag. The Saddlebag carries all of your briefcase items in slim, lightweight, leatherette or nylon, executive style. It conveniently fits over the Mac portable case combining the two cases into one attractive carry-on.

The EXECUbrief was specially designed for MacAcademy, the nation's leading Macintosh training organization. MacAcademy trainers travel to hundreds of cities, and need the very best in convenient luggage. Now a traveler can carry a garment bag in one hand and the Macintosh and a briefcase in the other.

The EXECUbrief is designed to fit in airline storage compartments or fit under your airline seat. The EXECUbrief has storage compartments specifically designed to carry the new small inkjet printers, computer disks, and all of your briefcase items. The EXECUbrief can even hold a change of clothing. (Even if you don't travel, the EXECUbrief eliminates the need for a briefcase.)

The unique EXECUbrief is designed to withstand the rigors of travel and carries a full year, satisfaction or money back guarantee. Here is a Macintosh product designed by Macintosh travelers. The quality is excellent, the benefits immediate.

To Order.

EXECUbrief is only $99 (nylon) or $149 (leatherette).

To order call (904) 677-1918 with credit card information or write: EXECUbrief 477 S. Nova Rd. Ormond Beach, FL 32174. Orders may also be sent by FAX to (904) 677-6717. Please add $5.00 shipping and handling per case.

The new EXECUbrief saddlebag eliminates your briefcase.



Now, in one bag, carry computer, printer, disks, and all items needed to be completely portable.



The new EXECUbrief easily carries all items normally found in an executive briefcase.

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Macintosh Training That Works

"I have been using FileMaker for about a year now and decided to get the MacAcademy tape to see how the program was presented, the content, and to see if other tapes would be useful. After looking at the tape I promptly ordered three more! Needless to say I was pleased, as the tapes are professionally done and most useful. You and your company do a fine job." Mr. James H. Patterson, M.D.

DAYTONA BEACH, FL- *"There's got to be a faster, easier, and less expensive way!"* This statement sums up the frustration that Randy Smith felt three years ago as he tried to find training for the Macintosh computer.

That frustration led to the creation of MacAcademy, now the nation's leading Macintosh training program, and the recent introduction of the country's **first complete Macintosh Video Training Series.** MacAcademy teaches over 18,000 people each year in 65 major metro areas. The program is proud of the fact that both beginning and advanced Macintosh users, from over 12,000 companies large and small, have found MacAcademy's live workshops to be an excellent, low priced training solution.

In order to offer additional training, MacAcademy's next step was to put each of their dynamic training workshops on video. (And to offer an additional dozen training videos for programs not even offered at MacAcademy.)

Now you may choose from over 26 different, 2-hour, VHS MacAcademy Videos for only $49 each. A complete list of programs can be found in the coupon below.

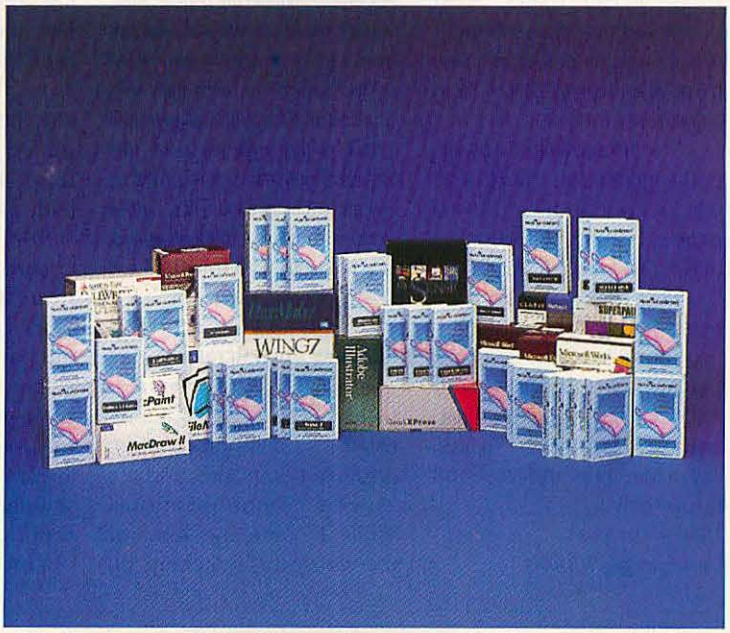
MacAcademy Video Training tapes offer tremendous advantages for today's Macintosh user. When using the videos you actually *see* the steps take place on a Macintosh screen. A small inset will show you the instructor and the mouse or keyboard. The instructors featured on the videos are MacAcademy's top rated teachers who have trained employees of all but two of the USA's Fortune 500 companies and who have each received a consistent rating of *excellent.*

Training videos offer the valuable advantage of building a learning and reference library. If you ever want to brush up on a technique, simply go back to the video and review the technique demonstrated. If you hire a new employee, simply have them review the video for the program they'll be using. Videos offer the unique flexibility of teaching both individuals or hundreds of people at one sitting.

In addition to a super $49 price, the videos also carry a 30-day satisfaction guarantee. If you're not totally satisfied, simply send the tape back for a full refund.

MacAcademy will continue offering the nation's highest rated live training courses in major cities. But in addition, you may also build your Macintosh training library.

Videos may be ordered by phone with credit card information, or by mail with check, credit card, or purchase order. You may also send orders by FAX. Your business is appreciated and your satisfaction is guaranteed.



The MacAcademy Video Library features over 26 Macintosh training tapes. Each two hour VHS video tape captures the unique and effective teaching and learning techniques of MacAcademy's top instructors.

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___ Advanced Mac	___ Advanced Word 4.0
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___ Intermediate Adobe Ill.	___ Intermediate QuarkXPress
___ Super Paint	___ Advanced QuarkXPress
___ Beginning PageMaker	___ Dollars and Sense
___ Intermediate PageMaker	___ Works: Integration
___ Advanced PageMaker	___ Works: Word Processing
___ Beginning Excel 2.2	___ Works: Data Base
___ Intermediate Excel 2.2	___ Works: Spread Sheet
___ Advanced Excel 2.2	___ HyperCard Basics
___ Beginning FileMaker II	___ Mac Networking Techniques

Number of Videos: ___ Number x $49.00: $_____
Add $1 Per Video Shipping: $_____
NAME _____ Florida Residents Add 6%: $_____
Total: $_____
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Circle 406 on reader service card

Type Manager [*Reviews*, February 1990] failed in every way possible.

Adobe spent a great deal of money promoting ATM with a specific and large group of Macintosh users: ImageWriter users. ATM promised to make ImageWriter text look like it came from something other than a last-resort printer.

The ImageWriter was virtually ignored in the review; you did not show a printed page of ImageWriter copy before and after ATM.

The hardware used to test ATM was entirely inappropriate; how the software performed on a Mac II with 8MB of RAM is useless information to someone using, say, a Mac Plus and a second floppy drive.

Hector Lareau
Champaign, Illinois

In addition to ImageWriter users, Adobe targeted ATM to the numerous users who would welcome its improved screen font representation. Because this affects all ATM users and not just those who use ImageWriters, we did emphasize this aspect more in the review. Also, as we pointed out, we were not satisfied with the results of using ATM on the ImageWriter, especially with small point sizes—so we saw little reason to say anything more. Ideally we should have tested ATM on low-end machines too. (Yes, it does work, with greatly reduced speed, on a Mac Plus with 1MB RAM and a second floppy drive.)—Ed.

ISDN and Other Acronyms

Jerry Borrell's *Commentary* (February 1990) foreshadows a collision between intuitive computing and advanced communications. While I commend him for recognizing the iceberg on the horizon, I'm compelled to warn of its size, of its shape, and just how soon we all may be cold and wet.

While ISDN runs over existing copper loops, it won't pass through an analog switch. Unlike France, we have too many functional but technologically outdated central telephone office switches to see their plugs pulled before fully amortized. That may not be all bad. Succeeding acronyms, BISDN (ISDN's broadband cousin), SONET (Synchronous Optical Network), SMDS (Switched Multimegabit Data Service), and FITL (Fiber in the Loop) will pale basic-rate ISDN's presently impressive 144kbps bit stream. In some ways it's like waiting for a 68040 before retiring that old Mac Plus.

In a country that frowns on cross-subsidy and outright prohibits local telephone companies from bundling premises equipment with service (remember, French Minitels were "free"), we won't likely see 20 million home videotex terminals following the French model. That may not be all bad either. Those 20 million terminals are 8-bit, mostly monochrome, and have a text interface. We of the Mac persuasion would demand more. Perhaps America's laissez-faire approach will, in the long run, deliver more too. I don't know if Apple will make the Minitel for the nineties with Timbuktu as its PageMaker, but it is good to see Apple trying to stay warm and dry. The more we know about what is ahead, the better we—and our

(continues)

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There are many hard drives on the market, but there is only one Hammer. The drive MacWeek dubbed "one of the best products on the market." The drive MacUser Labs rated as "the fastest drive for Macintosh..." The drive synonymous with superlative performance and reliability. The Hammer is now available in a variety of sizes to meet your requirements. **Hammer**™ external hard drives available at 188, 300, 600, & 1000 MB. 10.7 - 18 ms access time. **PocketHammer**™ compact external drives available at 40, 80, 100, & 175 MB. 15 - 19 ms access time. **Hammer Internal** drives available at 91, 188, 300 & 425 MB for Mac II/IIx and at 40, 80, 100, & 175 MB for Mac SE, SE/30, and IIcx. 9 - 19 ms access time. All Hammer drives come with extensive utility software and are AppleShare® and A/UX® ready. For more information on the drives with impact, contact your local dealer or call us at (415) 474-8055.

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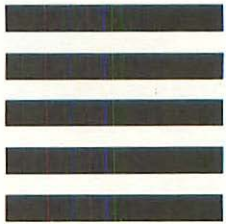
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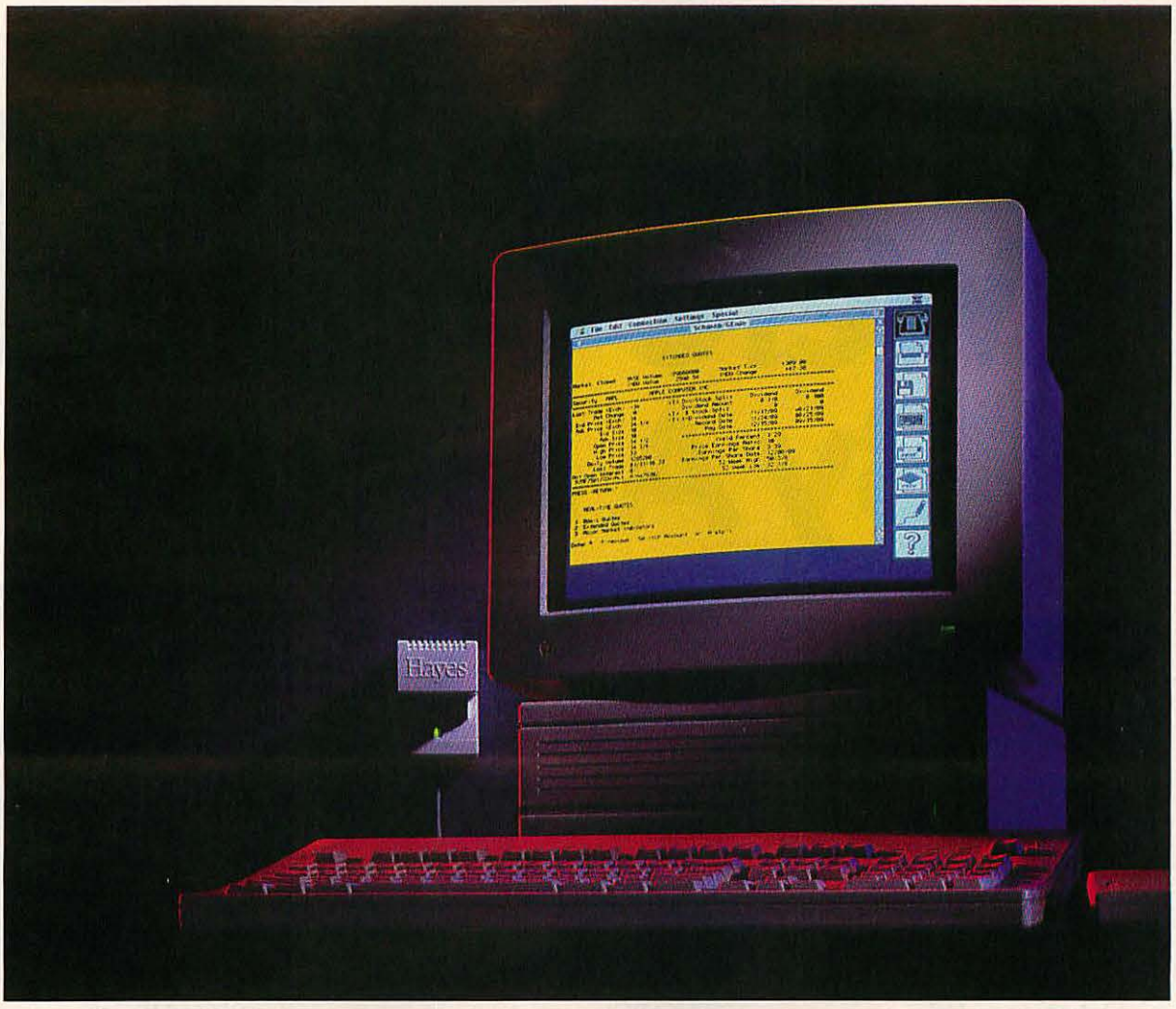
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All These Videos Were Created By A Mouse

ColorSpace IIi

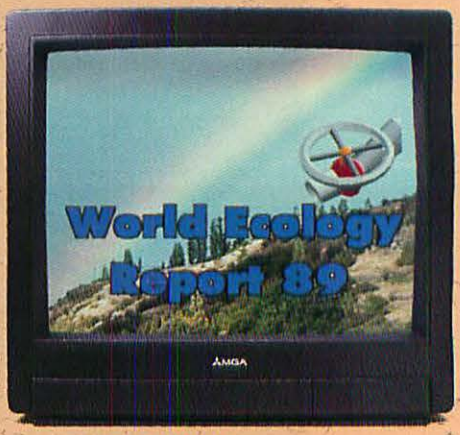
If you can point and click, you can produce professional quality color videos with ColorSpace IIi. The video card that lets you overlay anything created on a Mac II onto live or recorded video.



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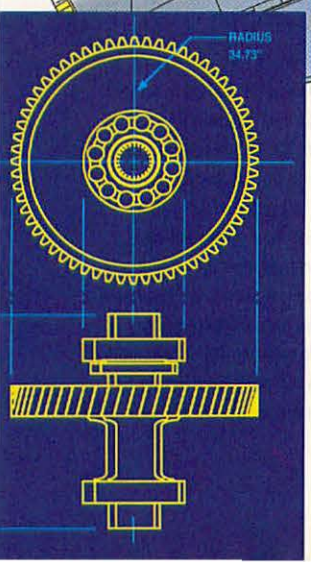
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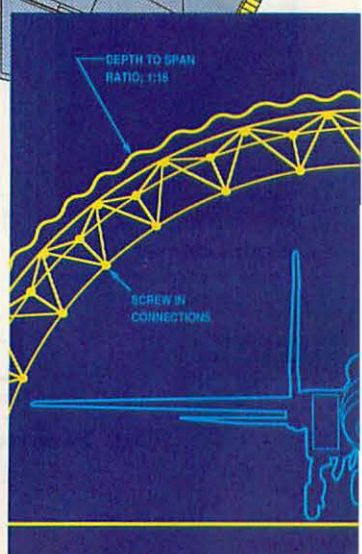
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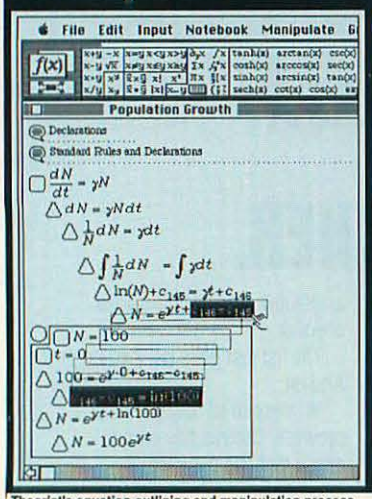
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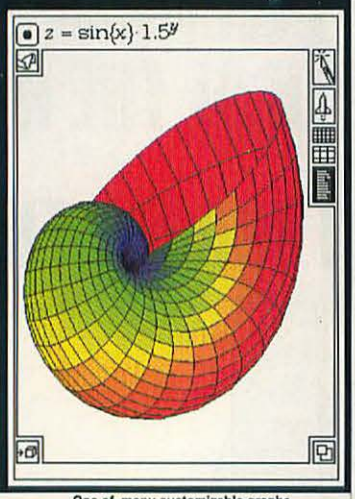
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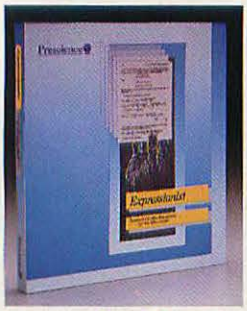


Theorist's equation outlining and manipulation process.

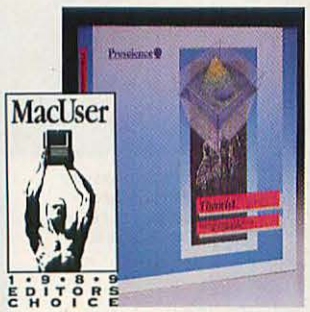


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computers—will be. To that end, Jerry Borrell's commentary is worth noting. (This letter reflects the author's personal view only and does not necessarily reflect the view of Bellcore or any of the Regional Bell Operating Companies.)

Ira Barron
Red Bank, New Jersey

FullWrite's Failings

Tony Hyman's complaint about the *Macintosh Bible* (*Letters*, January 1990) sounded like it was written by an Ashton-Tate PR agent.

I wrote the FullWrite Professional review in the *Macintosh Bible*, not Arthur Naiman (as indicated by my initials at the end of the review). I'm glad to hear that Hyman has successfully written long books with FullWrite and that he likes its many features that are still lacking in Microsoft Word. However, that doesn't change the fact that version 1.0 was shipped with serious LaserWriter printing bugs that had been reported to Ashton-Tate during the beta test, that the program is very slow, and that the documentation is poorly organized and wrong in many parts.

My review downgraded FullWrite for these traits, not for the features that Hyman seems to think are more important than performance and reliability. The *Macintosh Bible* is aimed at all Mac users, not just power users with extra megabytes of RAM, fast CPUs, and the high tolerance for bad documentation that FullWrite Professional requires.

Paul E. Hoffman
Berkeley, California

Accessing CompuServe

I'd like to clarify a point about ACIUS's 4th Dimension ("Insights on 4th Dimension 2.0," January 1990). Regarding the ACIUS forum on CompuServe: you can access CompuServe via a personal computer, a modem, and virtually any communications software, not just CompuServe Navigator.

Kitty Munger Thomas
CompuServe
Columbus, Ohio

You're right. We didn't mean to imply that you couldn't access CompuServe without CompuServe Navigator, only that it was the recommended method, since Navigator vastly simplifies and streamlines the process.—Ed.

Hitting the Mac Jackpot

I would like to clarify your description of our product, MacLotto (*New Products*, March 1990). MacLotto generates numbers based on the pari-mutuel number-selection theory. By selecting unpopular numbers, it increases your probability of not having to share prizes when you hold a winning ticket. MacLotto uses the Odds Improvement Multiplication algorithm, a patented number-selection process that provides a method of covering more prizes for each dollar wagered. Also, our fax number (508/653-9193) was listed instead of our number for placing orders (800/752-9749).

Alan J. Reiss
U.S. Mathematical Laboratories
Concord, Massachusetts

• • • • • • • • • • •

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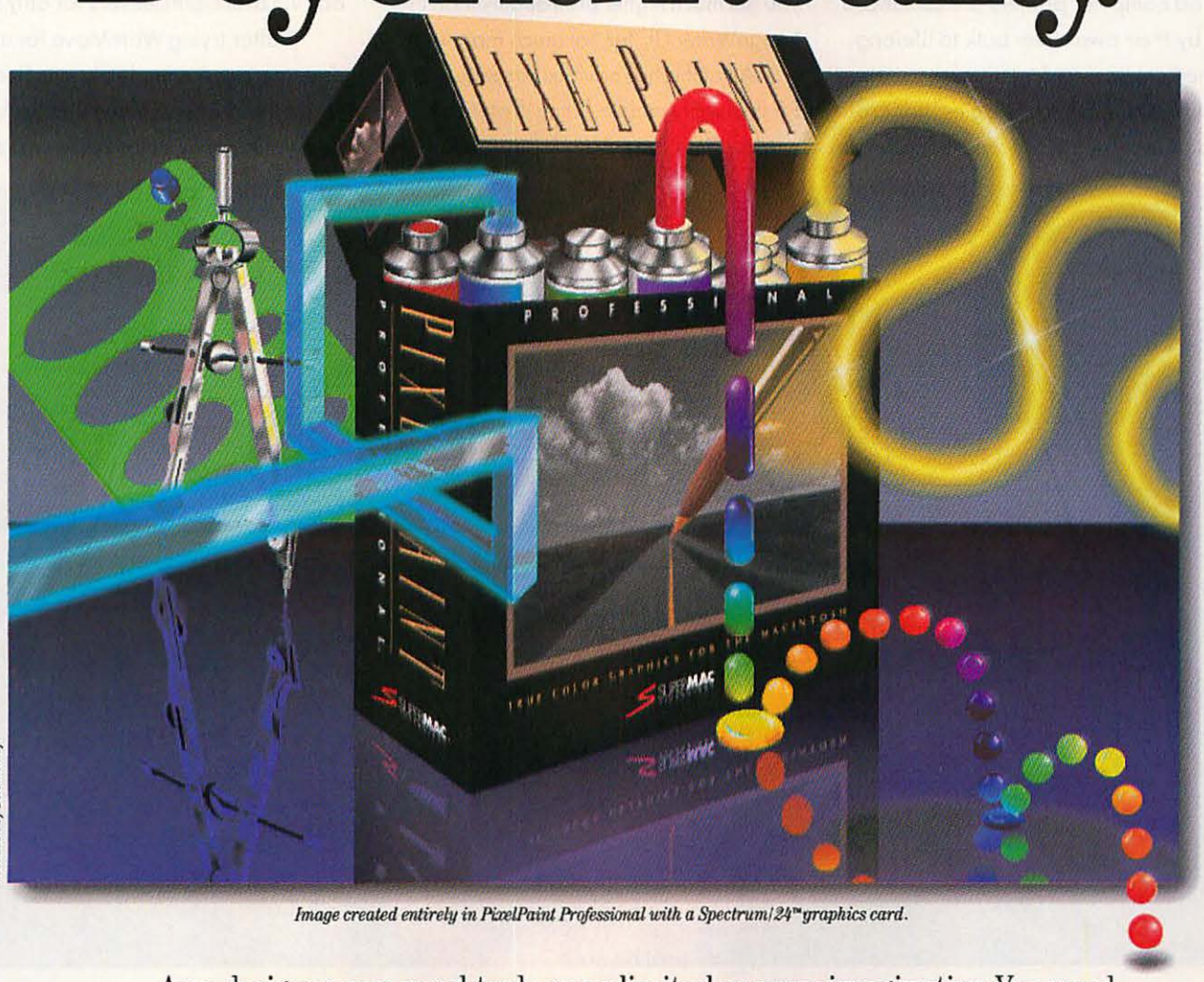


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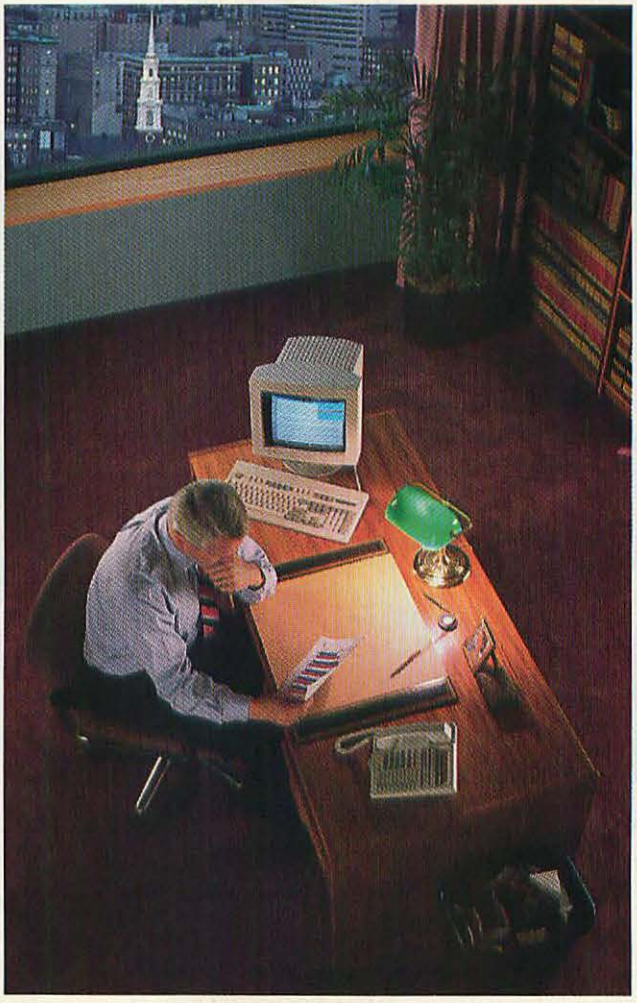
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ART BEAT

by Deborah Branscum

The tools and the talent behind Macworld's graphics and the techniques that make them possible

Artist: San Francisco–based artist John Hersey says, "Illustration isn't supposed to give you the whole picture. If it did, there wouldn't be any need for words."

Tools: Mac II with 5MB of RAM; Apple 13-inch RGB display; 40MB hard disk drive; ThunderScan; ImageStudio; and PixelPaint 2.0.

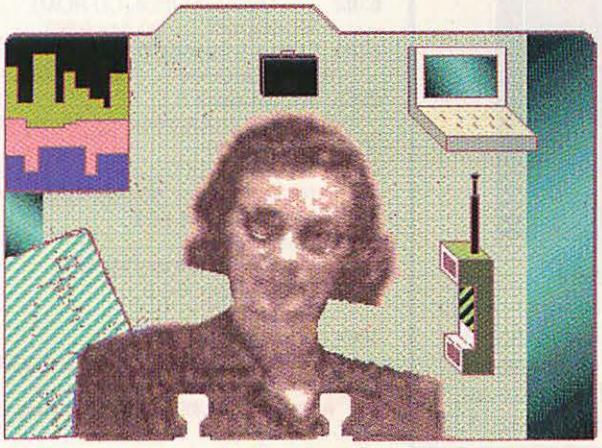
How It Was Done: For our feature on electronic Rolodexes (see page 323), Hersey created a collage using photocopied images of four people, added some hand-drawn elements, then scanned in the image.

He imported the 1-bit image into ImageStudio and converted it to 8-bit gray-scale. He added blurring effects for "a softer, richer effect," then saved as a TIFF file.

In PixelPaint he created a custom palette of 30 or so grays by copying white to the lower part of the palette, selecting all the colors between that white and black, then using the Blend command to create shades of gray in between.

Hersey closed the PixelPaint file (without quitting) and opened the TIFF file, which now used the custom palette. The 256 grays of the gray-scale image were reduced to the 30 grays of the palette. "It's a way to have a gray-scale image as well as a color image," says Hersey.

Once the gray-scale image was in PixelPaint, Hersey changed the grays in his custom palette to a gradation of pink to brown for a sepia look and applied that color to the image. Then he used the rest of his palette to complete the illustration, by adding colors and creating objects such as the portable computer and telephone. M



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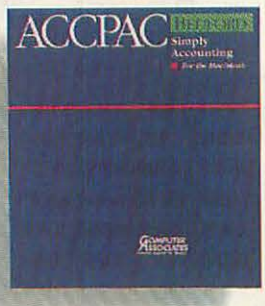
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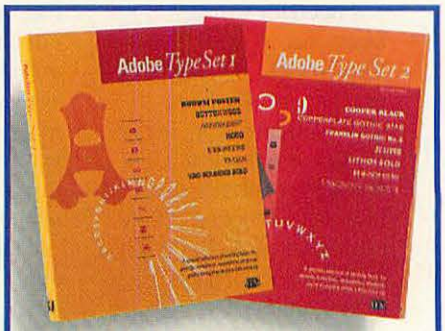
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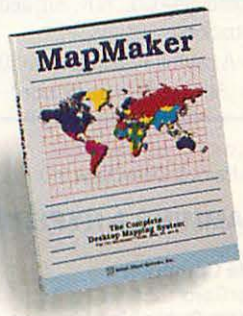
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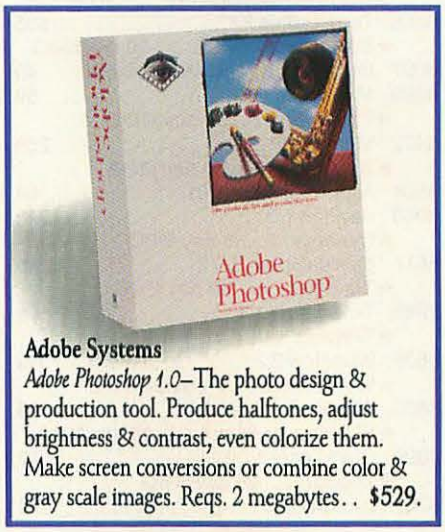
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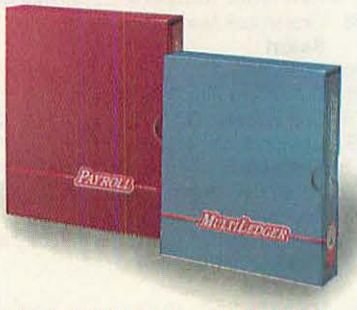
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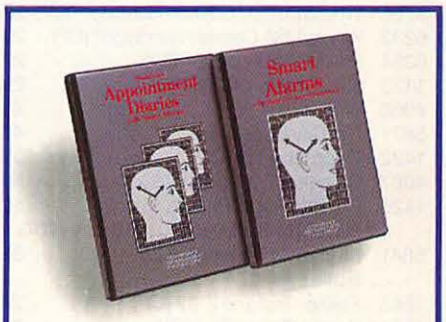
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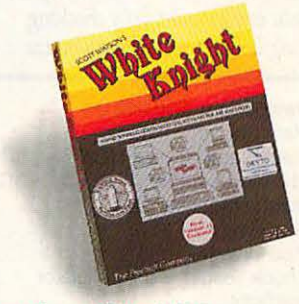
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4115 MacGallery *(HyperCard)*..... 27.
★Emerald City ... 30 day MBG
5728 LaserTalk 1.0 149.

starts getting low,



JAM Software ... 30 day MBG
Smart Alarms w/Single User Appointment Diary–Desk accessory system organizes your time, sets personalized on-screen reminders, & leaves messages on other network users' diaries . . $49.
Multi-User Appointment Diaries . . **see line listing.**

★Foundation Publishing ... 60 day MBG
6701 HyperSpeller 1.0 29.
Hyperpress Publishing
4233 Icon Factory 1.0 29.
ICOM Simulations
5681 HyperTMON 1.0. 59.
4085 TMON 2.8.2 87.
★MicroMaps ... 30 day MBG
5512 HyperAtlas 59.
5518 QuickMap 59.
★Microsoft ... 30 day MBG
4471 QuickBasic 1.0 65.
★Millenium Software ... 30 day MBG
6105 HyperX 3.0. 65.
★Now Software ... 30 day MBG
(formerly SmethersBarnes)
6739 Prototyper 2.1. 185.



Freesoft ... 60 day MBG
White Knight 11–(Formerly Red Ryder) supports XMODEM, YMODEM, ZMODEM, Kermit, and CompuServe Error Correcting protocols. Includes Okyto 1.0, a Mac-to-Mac file transfer program, and a free subscription to GEnie . $85.

★Silicon Beach ... 60 day MBG
5100 SuperCard 1.5 $189.
6703 Inside SuperCard *(Microsoft Press)* . 17.
★Softstream Int'l., Inc. ... 30 day MBG
6513 Authenticate & Mutate. 79.
5440 HyperHIT 2.2 125.
★Somak Software ... 30 day MBG
5897 ScriptEdit 1.1 49.
★Springboard ... 30 day MBG
6692 PLUS 1.11. 115.
★Symantec ... 30 day MBG
4644 Just Enough Pascal 1.0 52.
3421 THINK Pascal 3.0 168.
3420 THINK C 4.0 168.
★Symmetry ... 30 day MBG
3318 HyperDA 1.2 45.
★TGSS ... 30 day MBG
6667 Prograph 1.2 125.
★TML Systems ... 30 day MBG
3549 TML Pascal II 3.0 *(w/MPW 3.0)* . . . 109.
Trendware
HyperTools #1 or #2 *each* 52.
True BASIC, Inc.
3587 True BASIC 2.02 55.
Additional Toolkits Available call
★Zedcor ... 60 day MBG
3985 ZBASIC 5.0. 89.

UTILITIES

★Abbott Systems ... 30 day MBG
5236 CanOpener 1.1 64.
★Affinity Microsystems ... 60 day MBG
1016 Tempo II 1.02 75.
★Aladdin Systems ... 30 day MBG
6169 Shortcut 1.0.2. 46.
6740 StuffIt Deluxe 63.
★American Power ... 30 day MBG
6102 PowerChute 1.0 65.
★Berkeley Systems ... 30 day MBG
5737 After Dark 1.1 22.
1541 Stepping Out II 2.02 49.
★Bravo ... 30 day MBG
5404 SPAMM 1.1 48.
★Casady & Greene ... 60 day MBG
2269 QuickDEX 1.4A 31.
★CE Software ... 60 day MBG
4689 MockPackage Plus Utilities 4.4 32.
1727 CalendarMaker 3.0. 32.
6278 DiskTop 4.0. 64.
1729 QuicKeys 1.2 64.
★Central Point ... 30 day MBG
5040 Copy II Mac 7.2 23.
5041 Mac Tools Deluxe 75.
★Connectix ... 30 day MBG
6123 Virtual 2.0 (for SE/30, IIcx, IIx, & IIci) 115.
6122 Virtual 2.0 (for Mac II, incl. PMMU) . 188.
★Dantz Development ... 30 day MBG
5255 Retrospect 1.1 149.
Dubl-Click Software
1824 Calculator Construction Set 2.05. . . 45.
★Electronic Arts ... 30 day MBG
1843 Disk Tools Plus 1.01 *(Batteries Incl.)*. 31.



Zedcor ... 60 day MBG
DeskPaint & DeskDraw 3.0–The most powerful graphic DAs updated and more powerful than ever. Can now edit B&W or color images up to 16.7 million colors $115.

★Fifth Generation ... 60 day MBG
4287 PYRO! 4.0 *(screen saver)* 22.
3954 PowerStation 2.5.2 34.
3955 Suitcase II 1.2.3 44.
5178 FastBack II 2.1 107.
5725 DiskLock 1.0. 107.
★HJC Software ... 30 day MBG
4803 Virex *(lastest version)* 52.
5885 Virex *(10 Pack)* 329.
ICOM Simulations
4084 On Cue 1.3. 35.
★Insight Development ... 30 day MBG
6173 MacEnvelope 4.1 79.
6171 MacPrint 1.2. 95.
★JAM Software ... 30 day MBG
6089 Smart Alarms w/Appt. Diary 2.9.1. . 49.
6088 Smart Alarms 3.02 *(1-4 Users)* 99.



Digital, Etc. ... 30 day MBG
Business Sense 1.3–An integrated accounting package for small to medium size businesses. Included free is the interactive tutorial "Teach Yourself Essentials of Accounting" by Addison-Wesley Publishing Co. (a $49.95 value) $269.

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We've got the chips,

6087 Smart Alarms *(5-8 Users)* $149.
6086 Smart Alarms *(9-15 Users)*. 199.

★Kent Marsh Ltd. ... 30 day MBG

5457 QuickLock 1.0 56.
2591 The NightWatch 1.03 86.
6134 MacSafe II. 107.

★Kiwi Software ... 60 day MBG

6267 KiwiEnvelopes! 3.0 35.

★Loop Software ... 30 day MBG

5442 PictureBook 3.2 39.

★Microlytics ... 60 day MBG

2732 GOfer 2.0 45.

★Microseeds Pub. ... 60 day MBG

4848 INITPicker 1.0. 25.
4210 Screen Gems 1.0 39.
2913 Redux 1.6. 49.

Olduvai

4503 MultiClip 1.01 50.

★ON Technology ... 1 year MBG

6385 On Location 1.0 75.

★Peter Norton ... 30 day MBG

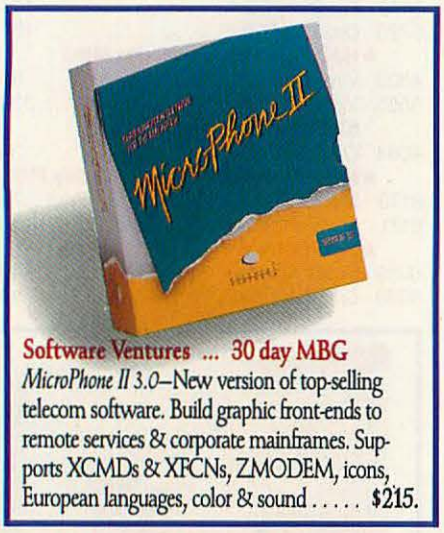
6748 Norton Utilities for the Mac 73.

★Preferred Publishers ... 30 day MBG

6656 Personality!. 49.

★Software Innovations ... 30 day MBG

5869 HandOff 1.1 32.
6647 HandOff II. 52.



Software Ventures ... 30 day MBG

MicroPhone II 3.0–New version of top-selling telecom software. Build graphic front-ends to remote services & corporate mainframes. Supports XCMDs & XFCNs, ZMODEM, icons, European languages, color & sound **$215.**

★Solutions, Inc. ... 60 day MBG

3448 SmartScrap & The Clipper 2.1 45.
3449 SuperGlue II 2.01 61.

★SuperMac Software ... 60 day MBG

3383 SuperSpool 5.0 58.
3382 SuperLaserSpool 2.02 87.
3378 SuperLaserSpool 5-Pack 2.0 289.
3377 DiskFit 1.5 58.
3379 Network DiskFit 1.5. 225.
3381 Sentinel 2.0 87.

★Symantec ... 30 day MBG

5176 Symantec Anti-virus for Mac *(S.A.M.)*. . 68.
5724 Symantec Utilities for Mac *(S.U.M.)* . . . 99.

★Synex ... 30 day MBG

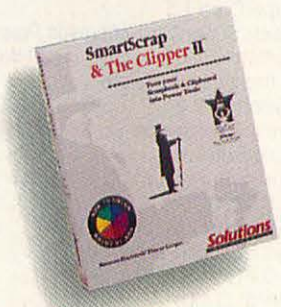
6665 MacPhonebook 51.
6666 MacEnvelope Plus 185.

★Williams & Macias ... 30 day MBG

3784 myDiskLabeler w/LaserWriter 2.9.1LI. 33.
4976 Sticky Business 1.1. 89.

★XTree ... 30 day MBG

5177 XTreeMac 1.02 52.



Solutions, Inc. ... 60 day MBG

SmartScrap & The Clipper II–SmartScrap DA creates multiple scrapbooks, stores & searches images by name or thumbnail Index. Copy all or part of an image with a marquee or lasso. The Clipper crops & scales images to precise sizes **$45.**

LEARN & PLAY

Accolade

1184 Hardball *(CP)* 27.

Activision

4486 Manhole. 29.
5517 Cosmic Osmo. 41.

★Ars Nova ... 30 day MBG

1215 Practica Musica 2.2 69.

★Bogas Productions ... 60 day MBG

4255 Super Studio Session 2.0 65.
6135 Super Studio Session Bundle Pack *(incl. Brass, Country, String Quartet, Heavy Metal Rock, and Sound Effects disks)*. 99.

Bright Star Technology

3961 Talking Tiles 1.0 27.
1402 Alphabet Blocks 1.0 30.

Broderbund Software

4314 Type! 1.0. 18.
5886 Star Wars *(CP)* 24.
4099 Shufflepuck Cafe *(CP)*. 24.
1421 Ancient Art of War *(CP)* 27.
4540 Ancient Art of War at Sea *(CP)*. 27.
6516 The Playroom *(CP)* 27.



Nolo Press ... 60 day MBG

For the Record 1.03–Organize personal, financial, and legal records for quick reference **$28.**
WillMaker 3.0–Here's the first step in estate planning. Prepare your own valid will without a lawyer **$32.**

4229 Where/World Carmen Sandiego? *(CP)* $29.
5755 Where/Europe Carmen Sandiego?*(CP)* 29.
5233 Where/USA Carmen Sandiego? *(CP)* 29.
6384 PlayMaker Football *(CP)* 29.
1423 Jam Session 1.0 *(CP)* 29.
4966 SimCity 1.1. 29.
5871 SimCity Supreme 48.
1422 Geometry 1.2 *(CP)* 59.
4067 Calculus 1.2 *(CP)* 59.
1426 Physics 1.2 *(CP)* 59.

★Bull City Software ... 30 day MBG

5841 Moriarty's Revenge *(CP)* 32.

Bullseye

1545 Fokker Triplane 2.02 *(CP)* 24.
1544 Ferrari Grand Prix *(CP)* 32.
4074 P51 Mustang Flight Simulator *(CP)* . 32.

Carina Software

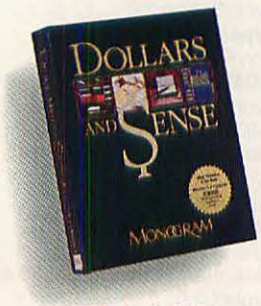
5726 Voyager 1.2 89.

★Casady & Greene ... 60 day MBG

2268 Crystal Quest 2.2T 25.

Coda Music Systems

5854 MusicProse 1.0. 169.
5604 Finale 2.0 559.



Monogram ... 30 day MBG

Dollars and Sense 5.0–New version! Easier to take charge of your personal or small business finances. New icon interface and improved automatic entries make daily checking, budgeting, & expense tracking a breeze . **$81.**

Davidson & Associates

1734 Math Blaster! 1.0 *(CP)*. 26.
6128 Math Blaster Mystery *(CP)*. 26.

★Electronic Arts ... 30 day MBG

6297 Halls of Montezuma 26.
6663 Sounds of Fire 29.
6716 Pipe Dreams. 26.
4064 Chuck Yeager Flight Simulator 32.
6594 Starflight. 39.
1846 Deluxe Music Construction Set 2.5 . 84.

★First Byte ... 30 day MBG

5294 Puzzle Storybook 1.0 *(ages 3-8)* . . . 27.
5293 Dinosaur Discovery Kit 1.0 *(ages 3-8)*. 27.

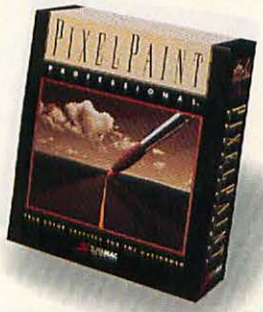
★Great Wave ... 30 day MBG

2276 KidsTime 1.2 *(ages 3-8)* 26.
5642 KidsMath 1.1 *(ages 3-8)* 26.
4334 NumberMaze 1.1 *(ages 5-12)* 26.
2270 American Discovery 2.3 *(ages 9 +)* 26.
2273 ConcertWare+ 4.0. 38.
2271 ConcertWare+ MIDI 5.0 99.

★HyperGlot ... 30 day MBG

Word Torture - Beginner to Advanced *(Span., Fren., Germ., Ital. & Rus.)* ea. 29.
Pronunciation Tutor - Beginner *(Spanish, French, German)* . . . ea. 35.

and plenty of tips,



SuperMac Software ... 60 day MBG
PixelPaint Pro 1.0–*Honorable Mention*–1990 MacUser Editors' Choice Award for *Best Graphics Program.* "Limitless colors, sophisticated effects, & an interface for creating, editing, & color-separating full-color images" ... $389.

Verb Tutor - Intermediate
(Spanish, French, German) .. *each* 42.
6604 Verbal Aspect - Inter. *(Russian)* 42.
6611 Kanjimaster - Beg. *(Japanese)* 105.

★Inline Design ... 30 day MBG
5870 Bomber *(includes headphones)* ... 26.

★Learning Company ... 30 day MBG
2670 Reader Rabbit 2.1 *(CP) (ages 4-7)* .. 31.
5453 Talking Math Rabbit 1.0 *(ages 4-7)* . 31.

MicroProse
4697 Pirates! *(CP)* 35.

★Microsoft ... 30 day MBG
2868 Flight Simulator *(CP)* 33.

Miles Computing
5253 The Puzzle Gallery 26.
2765 Fool's Errand 32.
2767 Harrier Strike Mission II *(CP)* 32.



Sony ... 60 day MBG
Sony Disks 3-Pak Special–Depend upon high-quality Sony disks to store and safely transfer everything your Mac throws at them.
3½ DS/DD 3 Pak (30) *special* $30.
3½ HD 3 Pak (30) *special* 60.

Mindscape
4083 Balance of Power 1990 *(CP)* $29.
3987 Colony *(CP)* 29.
4596 Deja Vu II *(CP)* 29.
5252 Gauntlet *(CP)* 29.

★Paragon Concepts ... 30 day MBG
6094 MacTag 2.04 42.

★Penton Overseas ... 30 day MBG
VocabuLearn/ce Levels I & II
(French, Italian, Spanish, German, Russian, and Level I Hebrew) *each* 29.
VocabuLearn/ce *Japanese* I & II *each* 35.

★Personal Training Sys. ... 60 day MBG
MacConnection carries the entire line of PTS modules. A partial listing follows.
5573 XL1 Beg. Spreadsheets *(Excel 2.2)* . 36.
5574 XL2 Inter. Spreadsheets *(Excel 2.2)* . 36.
5264 B2 The Basics *(for Plus or SE w/HD)* 36.
5266 B4 Beyond the Basics *(Mac)* 36.
4947 W1 Beginning Level *(Word 4.0)* 36.
4854 W2 Intermediate Level *(Word 4.0)* .. 36.
5098 W3 Advanced Level *(Word 4.0)* 36.
5269 LP1 Beginning Persuasion 36.
5194 H1 Using HyperCard 36.
4852 P1 Beginning PageMaker 3.0 36.
4853 P2 Intermediate PageMaker 3.0 ... 36.
5196 M1 Database & Form Letters *(Works)* 36.
5259 A1 Beginning Adobe Illustrator 36.
5278 FM1 Beginning FileMaker II 36.
5279 FM2 Intermediate FileMaker II..... 36.
6353 FH1 Beginning Level *(Freehand)* .. 36.

Postcraft
6466 Citadel 27.

Premier Technology
5773 Strategic Conquest Plus 2.0 34.
5774 NetTrek—The Real Version 2.3 34.

Sierra On-Line
3397 Leisure Suit Larry *(CP)* 23.
5694 Manhunter: San Francisco *(CP)* ... 29.
5458 Manhunter: New York *(CP)* 29.

★Silicon Beach ... 60 day MBG
3502 Beyond Dark Castle 32.
3503 Dark Castle..... 32.

★Softstream Int'l., Inc. ... 30 day MBG
4071 Mac•Man..... 23.
4072 The Solitaire DA 23.
4995 Cribbage Tutor 26.
6259 22nd Street Whist Tutor 32.
6258 MacRummy Tutor 32.
4073 Colour Billiards..... 38.

★Software Toolworks ... 30 day MBG
1842 Chessmaster 2000 *(CP)* 28.
4619 Mavis Beacon Typing 1.2B *(CP)* ... 32.
4588 Life & Death *(CP)* 32.
4945 The Hunt for Red October..... 20.
6111 Cribbage King-Gin King 39.

★Spectrum Holobyte ... 30 day MBG
3464 Tetris..... 20.
6112 Welltris 20.
3459 Falcon 2.2 30.

★Spinnaker ... 30 day MBG
2328 Sargon IV *(CP)* 29.
2329 SAT Score Improvement 1.0 *(CP)* .. 57.



Computer Associates/Cricket
Cricket Presents 2.0–Flexible presentation tool which organizes information, creates frames, tables, graphs and supporting materials, and produces color and B&W overhead transparencies and color 35mm slides $319.

★SubLogic ... 60 day MBG
4698 Jet *(CP)* 32.

True BASIC, Inc.
3571 Algebra *(with workbook)* 45.

★Wayzata Tech. ... 60 day MBG
6369 The World Factbook 1989 *(CD-ROM)* 69.

★XOR ... 30 day MBG
6152 TaskMaker *(CP)*..... 27.
4517 Road Racer *(CP)*..... 38.
4320 MacGolf Classic *(CP)* 53.
3815 NFL Challenge 1.2 *(CP)* 57.

NETWORKS & COMMUNICATIONS

★Abaton ... 30 day MBG
4589 InterFAX 12/48 Modem..... 265.
6266 InterFAX 24/96 Modem..... 419.



Layered ... 30 day MBG
atOnce! 1.01–1990 MacUser Editors' Choice Award for *Best Accounting Package.* "Superb integrated GL, AR, AP, and payroll system for small businesses. Automatic posting routines, password security, custom report writer" $285.

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Symmetry ... 30 day MBG
KeyPlan 1.0–Provides you with all the tools necessary to quickly and easily create, analyze, fine-tune, present and track your plans from outline to deadline $245.

★CE Software ... 60 day MBG
5174 QuickMail 2.2 *(5 user Pak)*..... 219.
5173 QuickMail 2.2 *(10 user Pak)*..... 319.
★CompuServe ... 60 day MBG
1676 CompuServe Information Service.. 24.
1673 CompuServe Navigator 2.1 39.
Connect, Inc.
5834 Connect 1.5 for the Macintosh 63.
★DataViz ... 60 day MBG
1823 MacLink Plus/PC 4.12..... 119.
4842 MacLink Plus/Translators 4.12..... 99.
★Dove Computer ... 60 day MBG
6758 DoveFax Desktop..... 279.
4939 FastNet III..... 375.
4938 FastNet SE..... 375.
5624 FastNet SE/30..... 375.
4937 FastNet SCSI 749.
★Dow Jones ... 30 day MBG
5295 News/Retrieval Membership Package 24.
★Farallon Computing ... 30 day MBG
5707 Timbuktu 3.0 95.
4866 Timbuktu/Remote 1.0.1 125.
6371 Timbuktu/Remote Access Pack .. 849.
4867 Timbuktu 30-Pack 3.0..... 1285.
2201 TrafficWatch 1.08..... 125.
2202 PhoneNET to LocalTalk Adapter..... 8.
5664 PhoneNET StarConnector..... 20.
6273 PhoneNET StarConnector 10-Pack. 139.
2203 PhoneNET PLUS *(DIN-8)*..... 32.
4869 PhoneNET Connector 10-Pack.... 198.
5251 PhoneNET CheckNET..... 64.
4868 PhoneNET Repeater 315.
2206 PhoneNET StarController..... 825.
6687 PhoneNET StarController - Ethernet1599.
5893 Portable Pack..... 329.
★Freesoft ... 60 day MBG
6115 White Knight 11..... 85.
Hayes
2300 Smartcom II 3.1A 85.
2307 Smartmodem 2400..... 349.
5170 2400 Internal Modem for Mac II .. 349.
6654 V2400 Internal Modem w/software 399.
6655 V2400 Baud Modem 439.
2298 Interbridge..... 639.
5991 V9600 Baud Modem 759.
Insignia Solutions
4089 SoftPC 1.3 245.
6688 SoftPC for the Mac Portable 245.
Intel Corporation
5119 2400EX Modem $179.
6265 2400EX with QuickLink II 195.
6420 2400EX MNP Modem..... 229.
6650 2400EX MNP with QuickLink II... 249.
★Microsoft ... 30 day MBG
5858 Microsoft Mail 2.0 Workstation..... 84.
5856 Microsoft Mail 2.0 Server..... 249.
★Nuvotech ... 60 day MBG
3000 TurboNet ST *(DIN-8)* 30.
6751 TurboNet ST *(12-Pack)*..... 279.
6272 NuvoLink SC..... 319.
6750 NuvoLink II..... 279.
6261 TurboStar 1359.
★Practical Peripherals ... 30 day MBG
3102 2400 Baud External Modem..... 179.
5285 PM 2400SA MNP Modem 209.
3089 Mac Communications Pack 1.5 .. 225.
★Shiva ... 30 day MBG
3444 NetSerial X232..... 279.
4347 NetBridge..... 339.
4942 TeleBridge 339.
3443 NetModem V2400 439.
6519 EtherGate..... 1629.

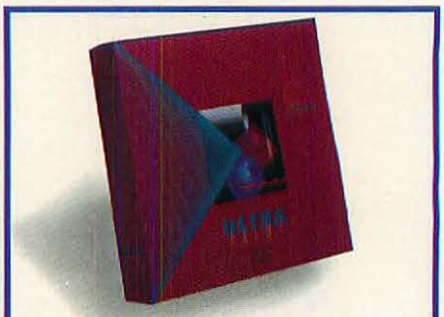


Farallon Computing ... 30 day MBG
MacRecorder 2.0–Take advantage of the Macintosh's sound capabilities with the Farallon MacRecorder Digitizer, a hand-held sound input device. The included HyperSound software lets you record directly into HyperCard $159.

★Software Ventures ... 30 day MBG
3455 MicroPhone II 3.0 215.
★Solutions, Inc. ... 60 day MBG
6721 Mailmaker 5 User Pack 117.
4308 BackFAX *(reqs. Apple FAX modem)*. 124.
6720 Faxgate Plus..... 239.
★Synergy ... 30 day MBG
6618 VersaTerm 4.1.1 88.
6619 VersaTerm-PRO 3.1.1 174.
★TOPS ... 30 day MBG
4598 TOPS FlashBox..... 119.
3725 TOPS Repeater..... 119.
3720 TOPS Flashcard 155.
6264 TOPS Network Bundle for Mac 3.0 189.
6377 InBox/Mac Administrator *(20 user)*. 215.
★Traveling Software ... 60 day MBG
3729 LapLink Mac III Connectivity Pac.. 119.
6741 LapLink Mac III Network Pac..... 185.

INPUT/OUTPUT

★American Power ... 30 day MBG
5895 110SE UPS..... 209.
6686 370ci 279.

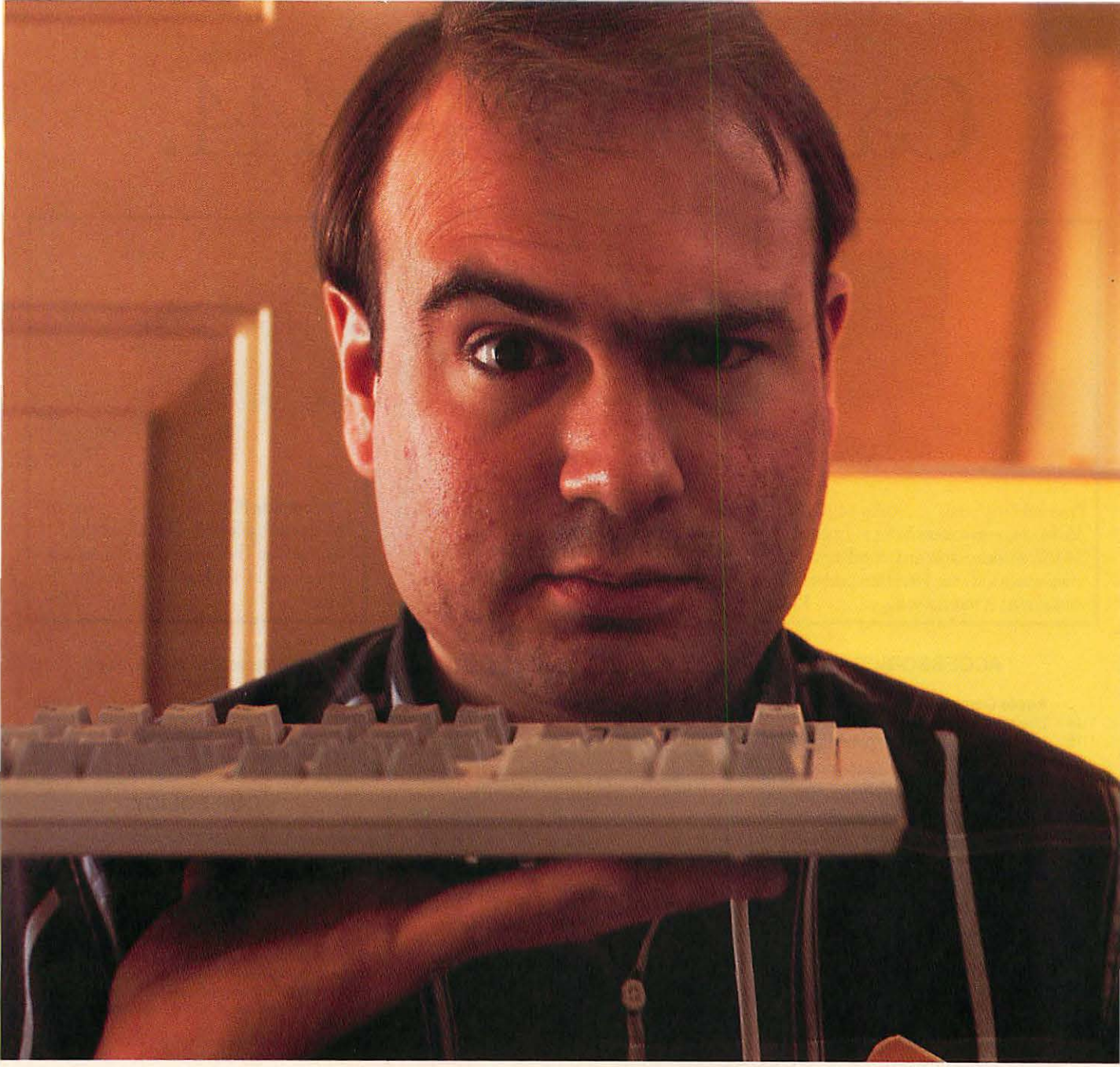


Deneba Software ... 30 day MBG
UltraPaint 1.5–B&W and color painting, grey scale editing and object drawing in one program. MacPlus' experience high res painting & every tool imaginable. Mac II's come alive with millions of colors & grey scale editing . $125.

Apple Computer
6717 Midi Interface 84.
6718 Mac II 8 Bit Video Card..... 549.
6714 Apple Hi Res Color 13" Monitor .. 849.
6719 Apple Portrait Display..... 899.
Caere
4476 OmniPage 2.1 539.
OmniSpell or OmniDraft ... *each* 69.
OmniTrace or OmniProof... *each* 105.
★CoStar ... 30 day MBG
6090 LabelWriter..... 185.
6067 LabelWriter Labels 11.
Cuesta
1607 DataSaver 200W..... 319.
1608 DataSaver 400W..... 429.
★Datadesk ... 30 day MBG
1818 HyperDialer..... 29.
6755 Switchboard..... 175.
1819 MAC-101 Kybd. *(beige)*... *special* 129.
1820 MAC-101 Kybd. *(platinum)* *special* 129.
1821 MAC-101 Kybd. *(ADB)* ... *special* 129.
★GDT Softworks ... 30 day MBG
6256 PrintLink Collection 3.01..... 59.
6151 JetLink Express 1.1 89.
6255 Expressive Fonts..... 119.



Custom Applications ... 30 day MBG
Freedom of Press 2.1A–1990 MacUser Editors' Choice Award for *Best Graphics/Publishing Utility* and *Honorable mention* for *Most Significant Software Product*. "Brings PostScript-printing capabilities to non-PostScript output devices"..... $259.



"Despite your incredible reputation, I was aghast."

Dear MacConnection,

A couple of months ago I had a minor problem with the status lights on my extended keyboard. Despite the fact that I had been using it for nearly 4 months, you took it back for a full refund. I didn't even have to ship it; you just sent Airborne to pick it up. Despite your incredible reputation, even I was aghast. I have been a Mac user since the 128K machines. Advice and support were very new to mail order then. It's interesting to note what you have done all by your lonesomes in New Hampshire. All the other mail order dealers have had to follow suit or fall out of business. You have truly "Macintoshed" mail order.

Paul D. Maddock
College Station, TX

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Macintosh Communications Pack 1.5–External 2400SA Modem, cable, and top-selling communications software. Hayes compatible, auto-answer. A superior value..... $225.

ACCESSORIES

Apple Computer

1114 LaserWriter Plus Toner Cartridge.. 105.
1115 LaserWriter II Toner Cartridge 111.

★Avery ... 60 day MBG

4864 Disk Labels 3½" *(Qty. 250)*..... 13.
5392 Disk Labels—Laser 3½" *(Qty. 630)*. 29.
4807 Laser Labels 1" x 2⅝" *(Qty. 3000)* 24.

★Basic Needs ... 60 day MBG

5635 Keyboard Flip..... 6.
Hard Cover-Keyboards *each* 15.
6682 Hard Cover-ImageWriter II..... 16.

★Computer Coverup ... 60 day MBG

1723 ImageWriter II Cover..... 8.
1724 Mac SE Cover..... 10.

★CoStar ... 30 day MBG

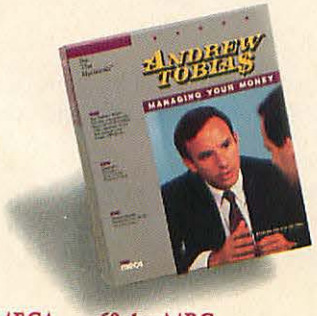
6091 The Organizer..... 199.

★Goldstein & Blair ... 30 day MBG

2267 The Macintosh Bible *(2nd Edition)*.. 19.

★I/O Design ... 30 day MBG

2379 MacLuggage Imageware II..... 49.
2376 MacLuggage Macinware Plus 64.
2381 MacLuggage Macinware SE..... 75.



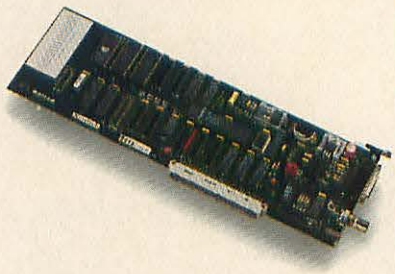
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Managing Your Money 3.0–Written by best-selling financial author Andrew Tobias, Managing Your Money is nine integrated programs in one. From checkbook manager to investment counselor, and more.... $124.

6129 The Ultimate SE Carrying Case... $79.

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4971 Modem/FAX Protector 20..... 25.
6722 LaserWriter II Security Kit 32.
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2579 Mac II Monitor Cable Extension Kit . 33.
2578 Extra Long ADB Keyboard Cable .. 25.
2545 Universal Copy Stand..... 22.
4972 Power Tree 10..... 19.
4973 Power Tree 20..... 27.
4974 Power Tree 50..... 54.
2559 Apple Security Kit..... 33.
4070 System Saver SE..... 52.
2566 System Saver Mac *(platinum)*..... 63.
2567 System Saver Mac *(beige)*..... 63.
2546 A-B Box *(DIN-8)*..... 63.
6763 SE Radiation/Anti-Glare Filter..... 52.
5064 Apple Color Monitor Polarizing Filter 63.
5065 Full Page Display Polarizing Filter .. 63.
5066 Two Page Display Polarizing Filter . 135.
5894 PowerBacker 360..... 269.
5577 PowerBacker 450..... 339.
5578 PowerBacker 520..... 399.



Nuvotech ... 60 day MBG

NuvoLink II–Ethernet interface card for the Macintosh II. Supports Thin and Thick wire Ethernet. Comprehensive installation and utility software offers helpful network and hardware diagnostic information. $279.

5230 PowerBacker 800..... 749.
5228 PowerBacker 1200..... 949.

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4623 Solid Oak Disk Case *(holds 90 disks)*. 32.

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2694 Moustrak Pad *(standard 7" x 9")* ... 8.
2692 Moustrak Pad *(large 9" x 11")*..... 9.
2693 Moustrak Pad L/F *(9" x 11")*..... 10.

Ribbons

Available in black, blue, brown, yellow, green, orange, purple, red, silver & gold.

3255 ImageWriter II Ribbon Black..... 4.
3261 ImageWriter II Ribbon Multi-4-Color ... 9.
3270 ImageWriter II Rainbow 6-Pack..... 20.

★Sopris Softworks ... 60 day MBG

4019 Mac SE & Ext. Keyboard Cover *(navy)*. 15.
4017 ImageWriter II Cover *(navy)*..... 11.
4012 High Trek ImageWriter II Carry Case . 49.
4013 High Trek Mac Plus Carry Case..... 59.
4014 High Trek Mac SE & Ext. Kybd. Case. 69.
5877 Mac II Monitor Carry Case 59.
5839 Mac IIcx CPU & Kybd. Carry Case . 69.



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TheComplete Page Scanner–The value of the 90's. Purchase TheComplete PC Scanner and receive Caere's OmniPage (SE version) free of charge..... $759.

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4862 SE Protection Pak *(ext. keyboard)*.. 75.

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3618 ImageWriter II Carry Case..... 45.
3617 Mac Plus/SE Carry Case..... 55.
4015 Mac SE & Ext. Kybd. Carry Case .. 69.
6116 Mac IIcx Carry Case..... 75.

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- COD max. $1000. Cash or certified check.
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- To order, call us anytime Monday through Friday 9:00 AM to 1:00 AM EST, or Saturday 9:00 AM to 5:30 PM EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 AM to 5:30 PM EST.

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Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders phoned into MacConnection weekdays by 8 PM EST will ship Airborne Express the same night for delivery the next business day, except for those within UPS Ground Zone 1 (which is also an overnight service). Saturday delivery available to many areas upon request. Some areas require an additional day delivery. The total freight charge on any order placed with MacConnection is only $3.

Hawaii, Alaska, Canada, Puerto Rico and U.S. Virgin Islands: Call 800/334-4444 for information on shipping and charges.

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back on the go.

6257 JetLink/Expressive Fonts Bundle. $159.

Hewlett Packard

6514 HP DeskWriter Printer. 859.
6689 HP DeskWriter & ATM Bundle. . . . 889.

★Kensington ... 30 day MBG

2576 Turbo Mouse for Mac Plus 3.0. . . . 109.
2547 Turbo Mouse ADB 3.0. 109.

Koala

2593 MacVision 2.1. 219.

Kodak

6730 DICOMIX M150 Plus Printer 489.

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4082 3-Button QuickStick ADB 49.
6099 ADB Trackball *(with foot pedal)* 79.

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5082 ScanMan Mac Model 32. 319.

Magnavox

6693 9CM080 14" Color Monitor. 529.
6690 14" Color Monitor with Micron Xceed for SE/30 *(640 x 480)* *special* 849.
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6690 Xceed for SE/30 *(640 x 480)* and Magnavox 14" Color Monitor 849.



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6673 Xceed for SE/30 *(1024 x 768)* 589.
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6621 MacTRAC ADB 75.

★Mobius Technologies ... 60 day MBG

6126 Mobius Cordless Mouse. 95.

★Mouse Systems ... 30 day MBG

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2809 A+ Mouse ADB 79.

★Nutmeg Systems ... 30 day MBG

4096 19" Monitor for Mac SE 1195.
5680 19" Monitor for Mac SE/30 1195.
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5138 Read-It! OCR Personal 2.1 125.
3034 Read-It! OCR 2.1 245.

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3036 Grappler C/Mac/GS 2.0 78.



Peter Norton ... 30 day MBG

Norton Utilities for the Mac–File Find, KeyFinder & Directory Assistance makes this a product for everyday use. Speed Disk reduces data access time. Norton Disk Doctor diagnoses & repairs over 45 different types of errors. . $73.

6229 Grappler LX 129.

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4561 SAFE 250 Watt Backup. 269.
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TheComplete PC

6104 Half-Page Scanner/400 309.
6103 Full-Page Scanner w/OmniPage. see box

Thunderware

3648 ThunderScan 5.0 with PowerPort . 185.
4994 LightningScan 369.

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Apple Computer

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5133 20 Meg Hard Drive. 359.
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3991 45+ Meg Hard Drive 489.
5275 60+ Meg Hard Drive 589.
5276 80+ Meg Hard Drive 649.



Dove Computer ... 60 day MBG

MaraThon 030 Upgrades–Provide the ultimate System 7.0 solution. Each product offers performance, system flexibility and PMMU for your Plus, SE or Mac II $449.

5456 45 Meg Removable Drive $799.
5736 45 Meg Removable Cartridge 109.

★Dove Computer ... 60 day MBG

5879 MaraThon Serial/Parallel 195.
6727 MaraThon 030 Serial/Parallel. 189.
6726 MaraThon 030 MultiComm 319.
6725 MaraThon 030 for Mac II. 449.
6724 MaraThon 030 for SE 449.
6723 MaraThon 030 for Plus. 449.
1807 MacSnap 524E. 185.
1809 MacSnap 524S. 239.
1811 MacSnap 548E. 419.
1812 MacSnap 548S. 479.
1804 MacSnap 2S. 189.
1805 MacSnap 4S. 369.
5623 MaraThon Racer 149.

★Kennect Tech. ... 30 day MBG

5631 Rapport 199.
5632 Drive 2.4 *(includes FastBack II)* . . . 329.

NEC

6744 CDR35 CD-ROM Portable Drive . . 419.
6743 Mac Driver Kit. 64.



Kennect Tech. ... 30 day MBG

Rapport and Drive 2.4–Together they allow you to read, write and format all Apple and IBM 3½" formats, plus get two extra format options of 1.2 and 2.4. Drive 2.4 includes Fastback II. *Rapport* $199. *Drive 2.4* $329.

★SuperMac Tech. ... 30 day MBG

SuperMac drives include SuperSpool, SuperLaserSpool, Diskfit and Manager

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5451 Dataframe XP 330 Hard Drive. . . 2399.

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6749 XM 3201 CD-ROM Drive. 899.

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6148 3½" DS/DD Disks 3 Pak *(30)* 30.
3298 3½" HD Disks 1.44 Meg *(10)* 24.
6375 3½" HD Disks 3 Pak *(30)* 60.
6659 QD2000 40 MB Data Cartridge. . . . 19.

★MAXELL ... 60 day MBG

2792 3½" DS/DD Disks *(10)* 14.
2793 3½" HD Disks 1.44 Meg *(10)* 27.

★3M ... 60 day MBG

3943 DC2000 40 MB Data Cartridge. . . . 20.

★MacConnection ... 60 day MBG

6592 44 Meg. Removable Cartridge 89.

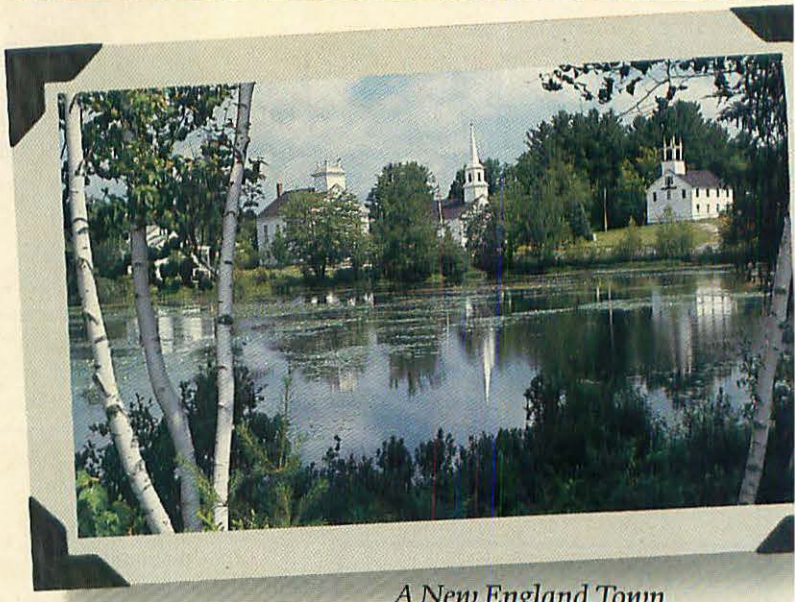
Welcome to Marlow, N.H. Where high tech heads for the hills.

Pat Gallup, President



Marlow is a historic New England village (pop. 567). But that doesn't mean we're old fashioned and dull. Admittedly, there aren't any shopping malls, movie theaters, comedy clubs, pizza shops, or five-star gourmet restaurants. But some of the goings on at Old Home Days make Times Square look like a slumber party. And when the bass are biting there's more than enough action for everybody.

You don't have to work in the country to offer traditional personal service. But we do get a lot of inspiration from our neighbors. And, besides, when you have a question, need something fast, or see a bizarre error message on your screen, who you gonna call? Some harried hacker in a high-tech high-rise? Or a mellow Mac expert in Marlow?



A New England Town

Like many New England towns, Marlow, New Hampshire is located on the banks of a river. In fact, our offices are just downstream from here—in what was the old sawmill by the dam, where they used to generate electricity for the village.



Eight Generations in Marlow

Marlow was incorporated in 1761. Arlene Rhoades is a descendent of its original settlers, the Huntley Family. She's been active in the Historical Society for many years and is the organist for the local Methodist Church.





Icebox of Cheshire Count

Winter temperatures can reach –30°F with a wind chill that's nothing to sneeze at. Needless to say, spring is a major event here.



Fire Warden

Charlie Strickland spent many years watching for fires from the old tower atop Pitcher Mountain. To this day, nothing much gets by Charlie.

We've learned a lot about service from our neighbors.

The Tinker Twins

Lucius and Lucian Tinker might not recognize all the fancy computers in Marlow these days. But Lucian, who ran the old dry goods store 'til 1916, would be right at home with our traditional, no-nonsense way of doing business.





Tax Collector

Marge Davis comes over to MacConnection twice a day and fills a big bag with cash. Just foolin', Marge!

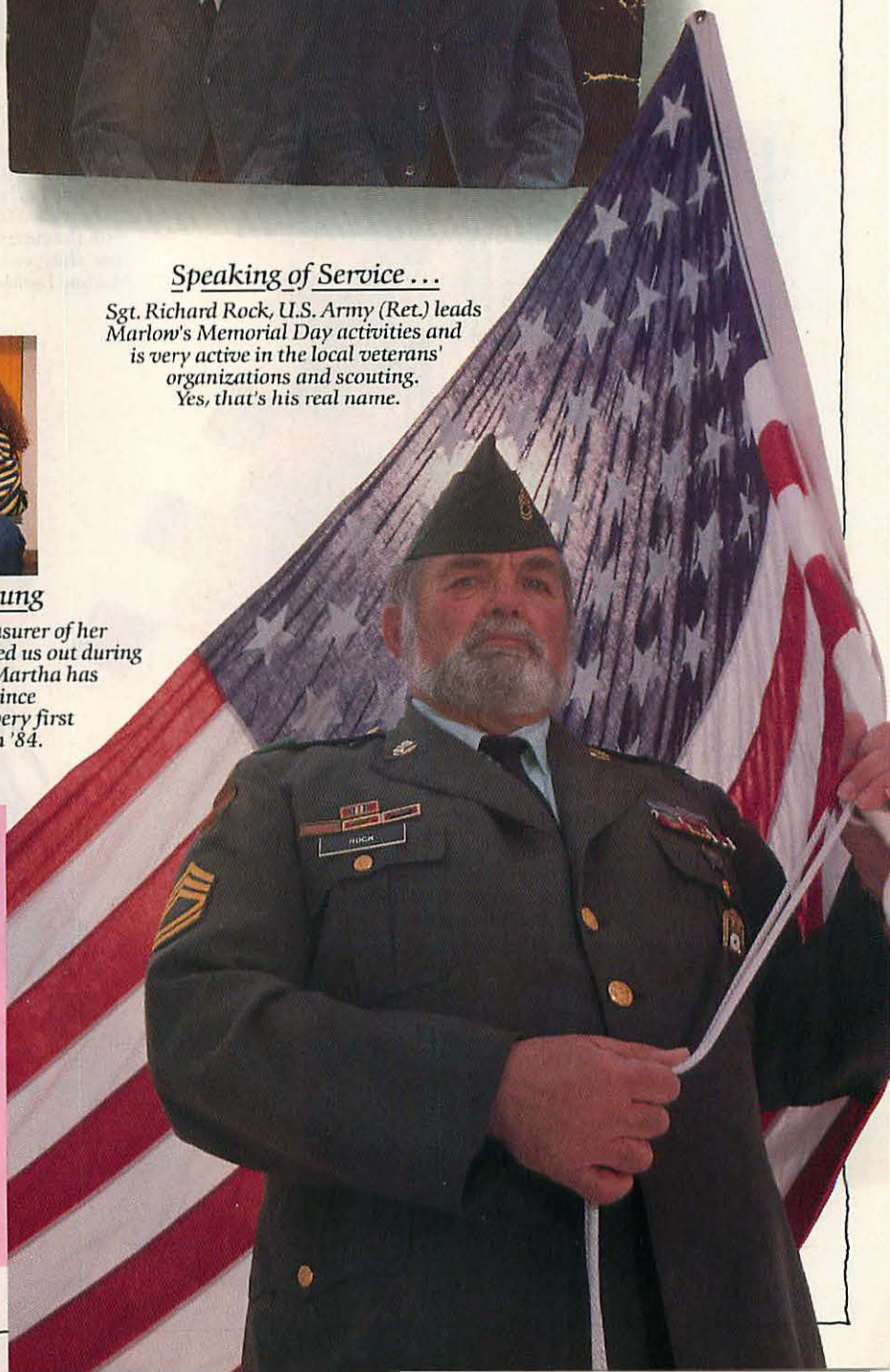


Start 'em Young

Kelli Strickland is Treasurer of her Senior Class, and has helped us out during vacations. Her Aunt Martha has worked for us since MacConnection's very first day way back in '84.

Speaking of Service . . .

Sgt. Richard Rock, U.S. Army (Ret.) leads Marlow's Memorial Day activities and is very active in the local veterans' organizations and scouting. Yes, that's his real name.



Ellen Wirta, Customer Service



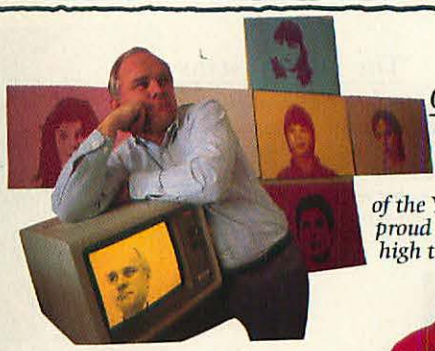
The first rule at MacConnection is to take as much time as you need and do whatever you can to help the customer. That's why we pioneered a 30/60 Day Money Back Guarantee, and can now offer it for most products. If you really don't like something, we don't think you should have to keep it. Sound simple? It is.

This is where Mac mail order meets Yankee ingenuity.

The Marlow Craft

Besides having more car mechanics than you can shake a tie rod at, we have woodworkers, weavers, potters, and fine patchwork quilters like our neighbor Lorraine Landroche.





Our School Principal

Richard Brewer was the "1988 IBM New Hampshire Computer Teacher of the Year." We're awfully proud of him, and admit it's high time we got him a Mac.



Alan Hague, Tech Department

The Mac may be "easy to use," but it's hard to keep up with the technology. Don't worry, that's our job. Here in this old Victorian inn there are plenty of people who've been Mac experts since the 128K. We've learned that "just 'cause it ain't working don't mean it's broke." So call us next time your Mac does something strange, and we'll help get you back in business.

"Just Call Me Tex"

Sharpening a sawmill blade correctly makes installing SIMM chips look easy. Marion "Call me Tex" Morgan lives right here on Mill Street and stays on the cutting edge by honing his sharpening skills at Marlow Lumber, Inc.



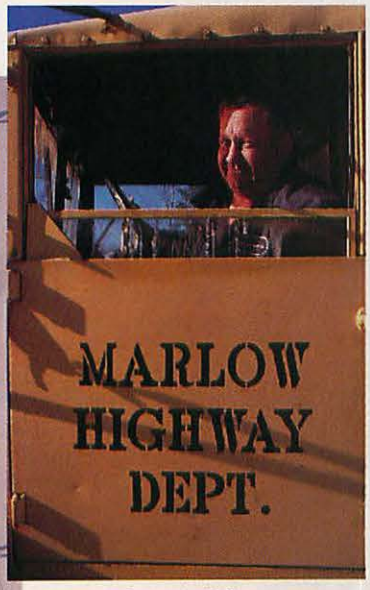
Back to Basics

Using a Mac is like riding a horse. Click. Click. Young Mary Ellen Miller just happens to like horses better. Her friend Robin Jones shows her the fundamentals.



In Marlow there's always a way to get there from here.





Roads Less Travelled

Our idea of a traffic jam is when there's a car in front of you at the local stop sign. But the roads of Marlow have become a little busier lately, thanks to our overnight delivery policy. Hartley "Buzzy" Sanders and his crew always keep our road open—even during dreaded "Mud Season."

Kevin Martin, Distribution



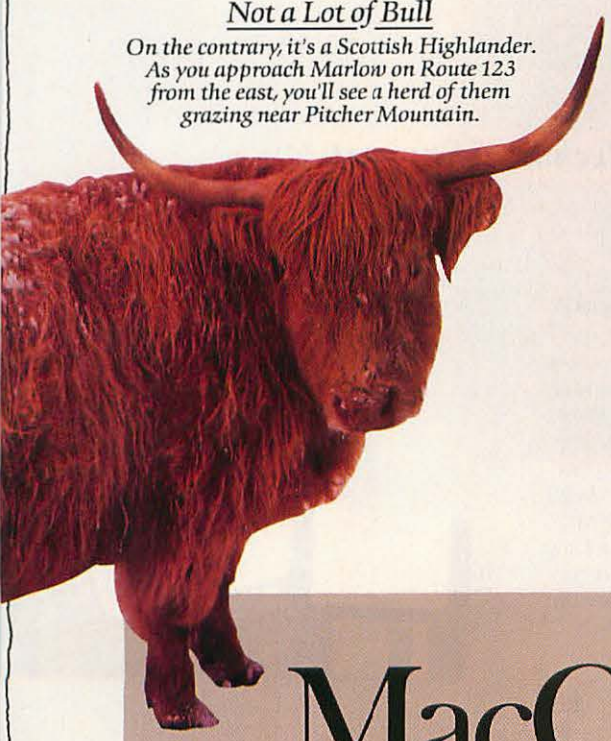
We set the Mac mail order standard of $3 overnight shipping because we know that when you're buying something for your Mac, you usually want it RIGHT NOW! Well, it's possible thanks to Airborne Express, some heavy-duty electronics, and a lot of teamwork. It also helps to have strong arms—especially when you have to hold all these boxes while they take your picture.

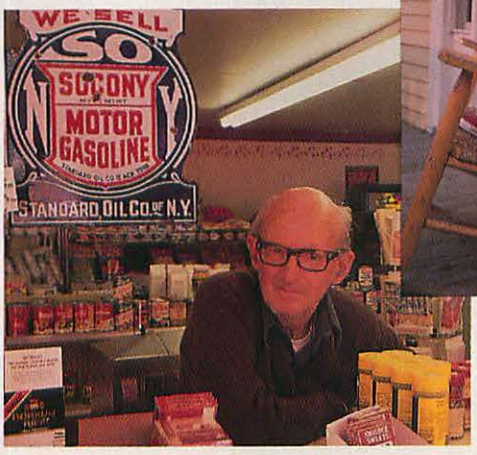
Our Role Model

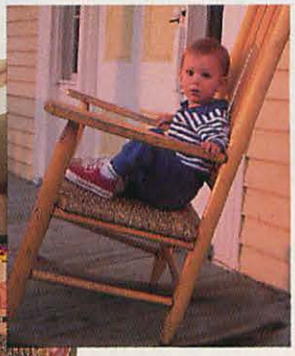
Marlow paper girl Jessica O'Brien has delivered the afternoon paper all over town through rain, snow, ice, and hail.

Not a Lot of Bull

On the contrary, it's a Scottish Highlander. As you approach Marlow on Route 123 from the east, you'll see a herd of them grazing near Pitcher Mountain.







Power Lunch, Marlow Style

You depend on us to deliver your Mac order in a timely fashion. Well, we depend on Elmer "Bud" Phelps to bring us lunch from the Marlow Village Store. Tyler Patria, whose mom and dad own the building the store's in, keeps tabs on Bud's comings and goings from his perch on the porch.

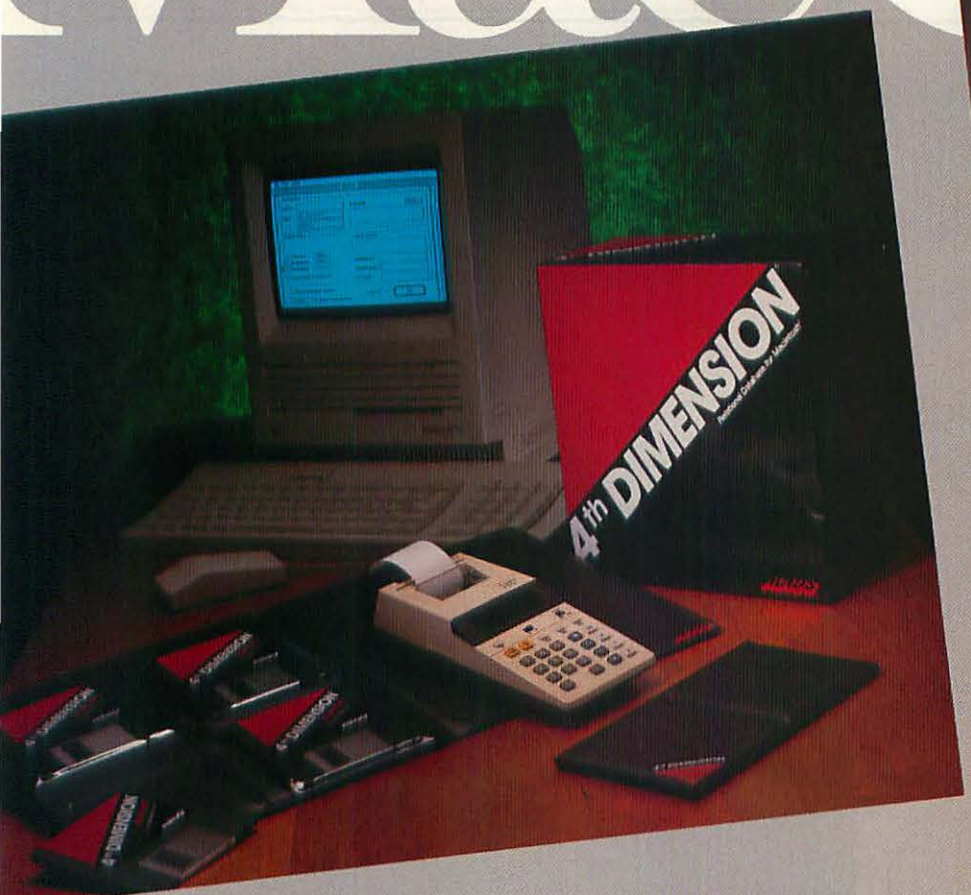


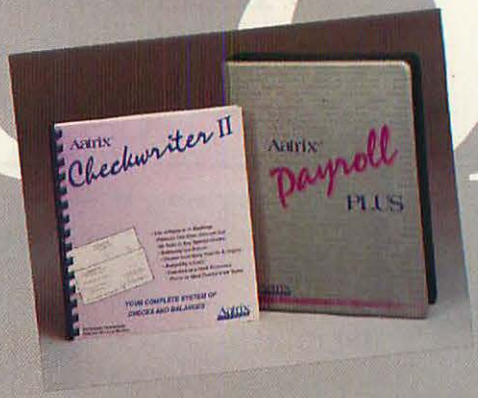
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MacCo





Automate Your Payroll. Here's a total payroll, bill paying, and cash accounting solution for small businesses. **Aatrix Payroll** processes and prints an unlimited number of employee paychecks with up to 12 deductions (Federal and State tax tables included). It'll even do your W2s. Export that data to Eddy-nominee **Checkwriter II** and it'll automatically remind you of (and write the checks for) Federal, State, and Local unemployment insurance, and other payments. You'll never pay a late fee again. Plus, Checkwriter II gives you total cash accounting, complete with reports.

Aatrix Software ... 30 day MBG

3976 Aatrix Payroll 3.5 **$109.**
5872 Checkwriter II 2.2 **37.**

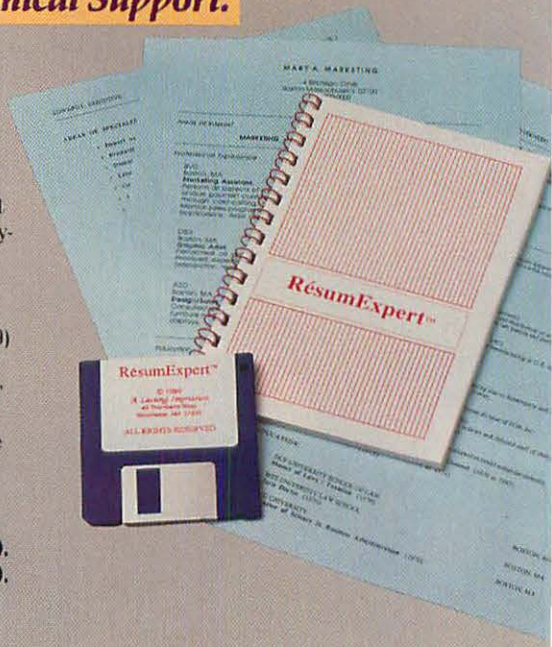


Tap The Power Of The 4th Dimension. When *MacUser* gave **4th Dimension** their 1989 Eddy Award for Best Database, they called it "the most powerful database on the Mac." Why? Because this relational multi-user database offers a straightforward approach to database design that makes it ideal for the novice, while also providing the flexible capabilities and sophisticated editors that intermediate and advanced users are looking for. Database professionals will appreciate the extensive configurability and programming language that enables them to create custom applications that are virtually indistinguishable from standalone applications. And, as *MacUser* (2/90) said: "You really can create powerful multifile database systems in version 2.0 without getting involved in coding at all." 4th Dimension is easy to use, but won't leave you stranded as your needs expand.

Acius ... 30 day MBG

5618 4th Dimension 2.0 **$469.**
4024 4th Dimension Runtime 2.0 **229.**

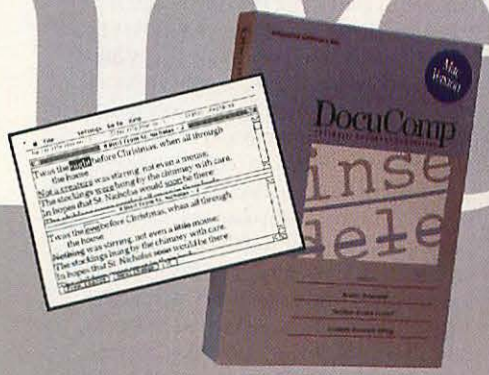
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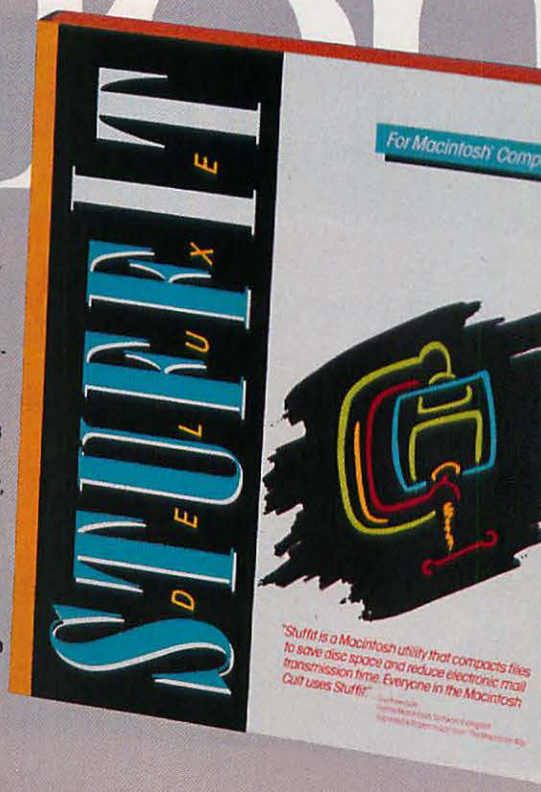
A Lasting Impression

5465 ResumExpert **$39.**
5749 Cover Letters **39.**



Compare And Save. DocuComp is the fast and accurate way to show differences between two versions of anything from a contract to a book to source code. Even documents from different word processors can be displayed simultaneously, revealing insertions, deletions, replacements, and moves. The comparisons can be saved or printed as needed. A great time-saver for technical writers, editors, lawyers, programmers, educators and others. Many copies have been sold to government agencies, which could only help to streamline the bureaucratic machine.

Advanced Software ... 30 day MBG
5608 DocuComp 1.2 **$89.**

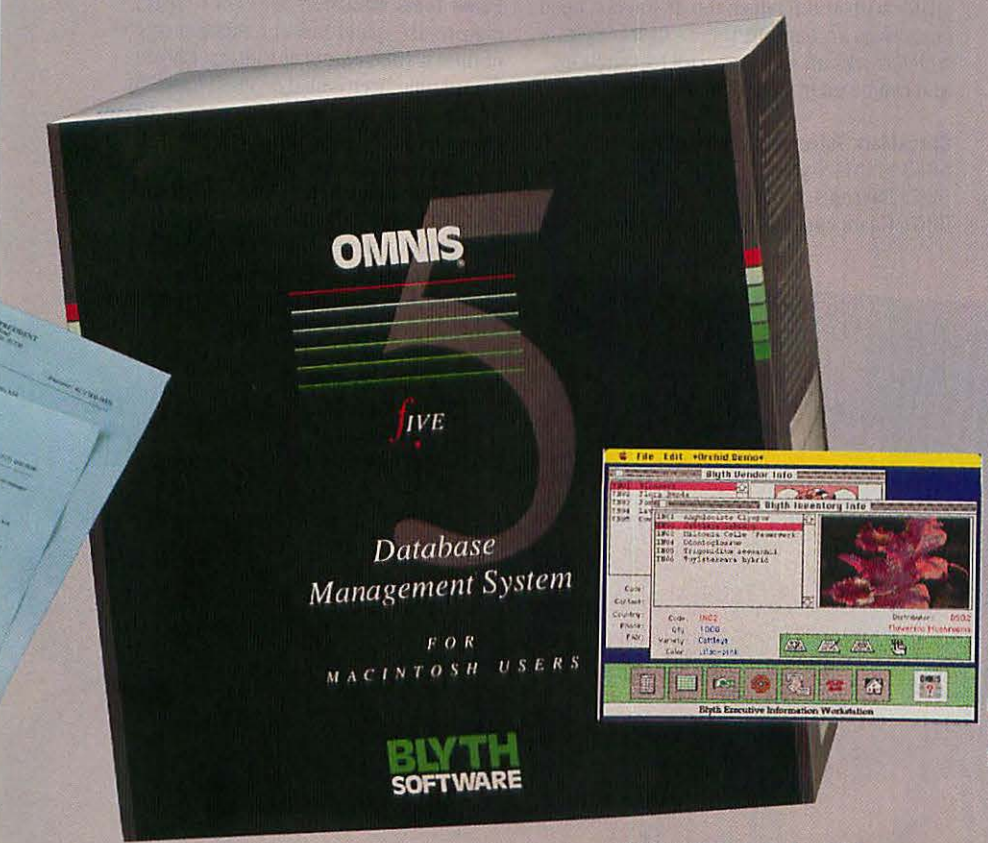


Get Compressed. Hey, sometimes even the best file needs to get compressed, especially if it's one of your biggest. With **StuffIt Deluxe** you can dramatically free up hard disk space. This essential utility uses state-of-the-art techniques to compress any file up to 50% or more. And it doubles as a great backup program. Use its Finder-like features to manipulate multiple archives, and drag files between and within archives. Sort, copy, move, delete, and rename archive entries. Use the built-in scripting language to automate your archiving procedures. Includes government-standard DES encryption for security, and special optimizers to increase compression. Also supports the ARC and Zip compression standards for MS-DOS, and even checks for viruses automatically every time you Stuff and UnStuff files.

Aladdin Systems ... 30 day MBG
6740 StuffIt Deluxe **$63.**

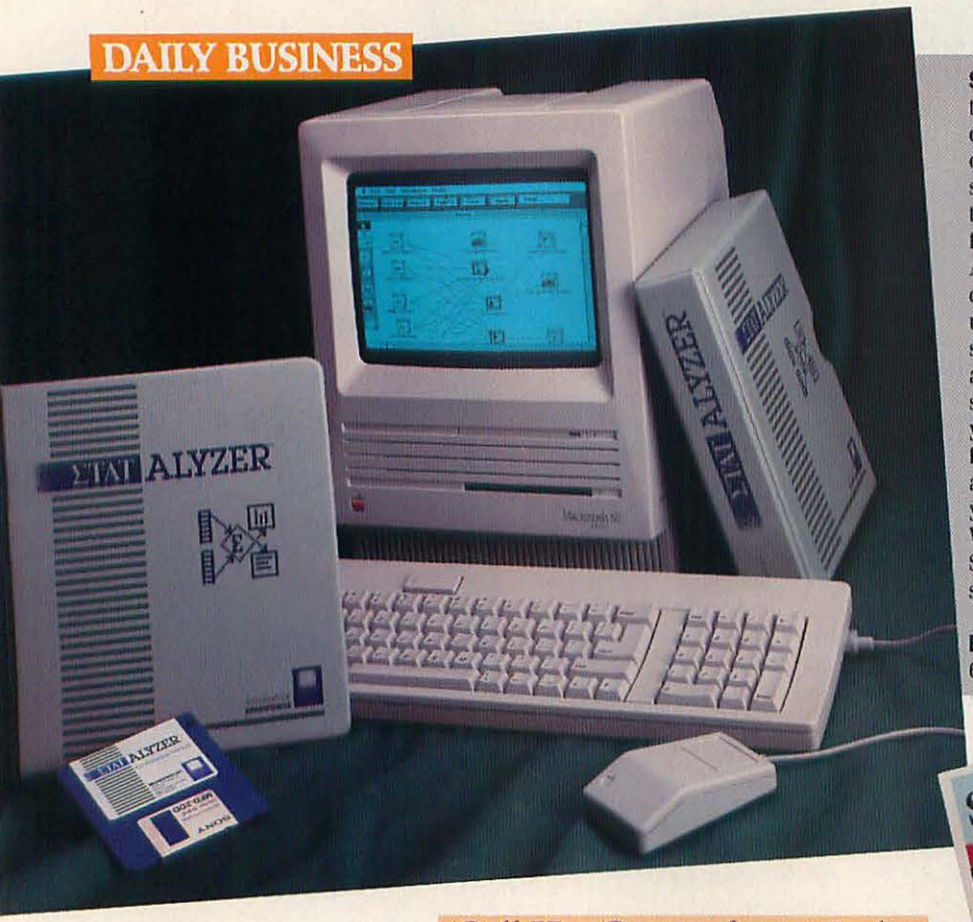
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Blyth Software
5492 Omnis 5 1.1 **$347.**
5855 Omnis *(Additional 1 user)* **59.**



Strength In Numbers. With **Statalyzer** you can turn your Mac into a statistical powerhouse capable of performing extremely sophisticated analyses. Choose from over 30 types of statistical analysis, from standard deviation to survival analysis. You can bring in data four ways: from the keyboard, Clipboard, via ASCII file import, or by simply drawing a curve by hand. Advanced features include user-defined function and range libraries, superimposed or juxtaposed graphic displays, and data sorts. After you've analyzed your statistics, Statalyzer will graphically display your results in numerous chart and graph formats, with full control over size, legends, and other variables. Update your data, and your charts and results are updated as well. Whether the numbers are strong or weak, Statalyzer will provide you the confidence to say so authoritatively.

BrainPower ... 60 day MBG
6362 Statalyzer 1.0 **$179.**



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CheckMark Software ... 60 day MBG
5863 MultiLedger 1.3 **$235.**
5862 Payroll 4.1 **175.**
5861 CashLedger 1.3A **115.**



Power Twins. MacCalc is the easy-to-learn, easy-to-use, super-fast spreadsheet that's earned a 1988 *MacUser* Editors' Choice Award, and been called a "must have" by *MACazine*. It features extensive formatting, integrated cell notes, and support for .WKS files for compatibility with *1-2-3* and *Excel*. And, we've bundled it at a special price with Bravo's **SPAMM**, the automatic INIT utility that can double the speed of calculations for your graphics, CAD/CAM, statistics, database work, and many other arithmetic operations on your Mac Plus or SE.

Bravo ... 30 day MBG
5404 SPAMM 1.1 **$48.**
1539 MacCalc 1.2D **79.**
6084 MacCalc/SPAMM ***special*** **115.**

Stop Typing. Start Scanning. Typing magazine articles and other documents into your Mac isn't anybody's idea of keyboard fun. But with **OmniPage**, you may never have to retype again. This advanced page recognition software will take a printed document and convert it into electronic form so you can edit, print, store it, or whatever. Based on AnyFont technology, OmniPage can read *any* non-stylized font, from 6 to 72 points—and do so at speeds in excess of 150 characters per second. And, it can recognize English and ten European languages. Which makes even Indiana Jones look like a monoglot. (Say what?) OmniPage automatically separates text from graphics, can read multiple column formats with ease, and can cut, copy and paste text before you send it to your favorite Mac word processor. It even recognizes spreadsheets and other financial forms. Note that since OmniPage has more features than the sphinx, it needs 4MB RAM (5MB with MultiFinder). 1989 *MacUser* Eddy Award for Best OCR Product.

Caere

4476 OmniPage 2.1 **$539.**
6658 OmniDraft *(dot matrix)* **69.**
6660 OmniSpell *(100,000 word dict.)* . . . **69.**
6661 OmniProof *(doc. comparison)* . . . **105.**
6662 OmniTrace *(bitmap to EPS)* **105.**



Make Sense Of Your Business. Keep on top of your business finances with **Business Sense**. It's a truly integrated Mac accounting package designed specifically for small- to medium-size businesses. It's all here: G/L, A/R, A/P, Invoicing, Payroll, Budgeting, and Reporting—all in one logical, easy-to-use system. Display all standard accounting reports in either text or graphical formats, and generate invoices, payroll checks, tax forms, and much more. And it includes the self-help tutorial *Teach Yourself the Essentials of Accounting*, a $49.95 value, at no additional cost.

Digital, Etc. ... 30 day MBG

6378 Business Sense 1.3 **$269.**



No Hidden Charges.

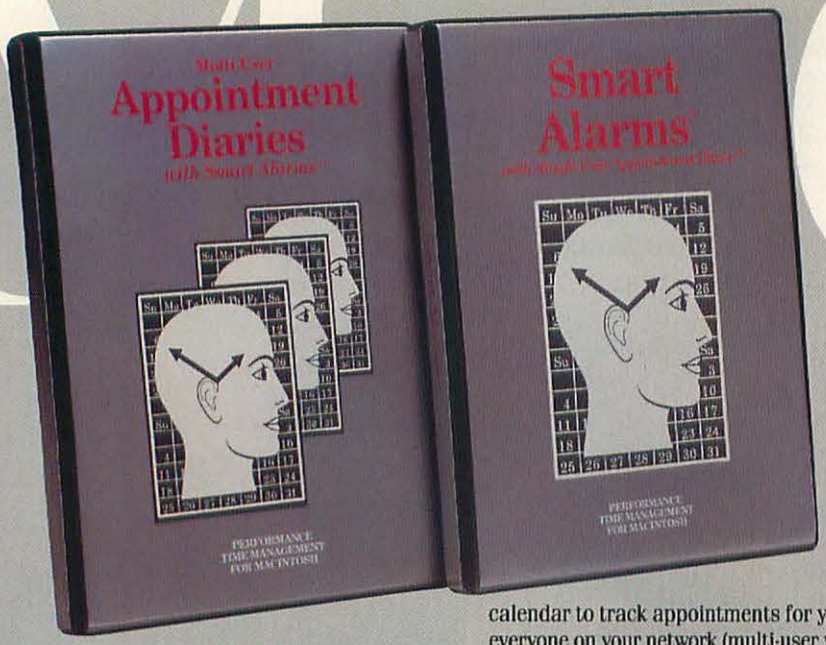
Manage Your Equity Without The Sweat. When was the last time you enjoyed balancing your checkbook? **Quicken** is the popular personal finance manager that eliminates the tedium of regular financial chores. It actually *learns* your monthly bills, balances your checkbook (automatically) and prints checks addressed for mailing. You make the money, Quicken will handle the math. It includes budgeting and cash-management features, and prints many useful reports. New in version 1.5 are more flexible reporting options, new check styles, and more. Perfect for home use, it's also powerful enough to run a small business. Best of all, you don't need to know *anything* about accounting. You only need to know Quicken.

Intuit ... 30 day MBG

2425 Quicken 1.5 **$36.**



34-444

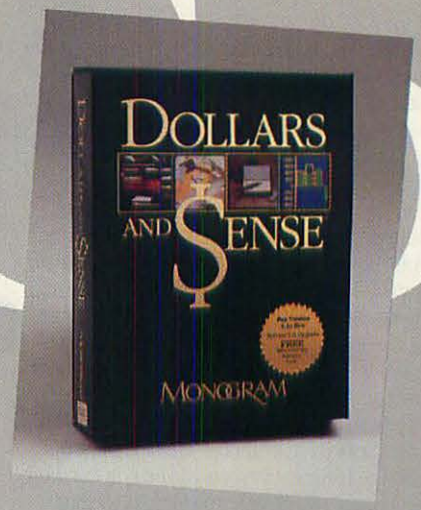


Know When To Be Where. Did you ever get so lost working on your Mac that you forgot some important appointment? **Smart Alarms** creates reminders and will have your Mac beep you at the appointed hour. Don't worry, there's a snooze button to shut out the world. And you can also get a printed schedule any time. **Appointment Diary** provides a daily calendar to track appointments for you or everyone on your network (multi-user version). Includes week and month at a view, and automatically sends notes and reminders to Smart Alarms. *MacWEEK* (3/89) called the pair the "most notable" in their class.

JAM Software ... 30 day MBG

6089 Smart Alarms w/Appt. Diary 2.9.1 **$49.**
6088 Smart Alarms 3.02 *(1-4 users)* **99.**
6087 Smart Alarms *(5-8 users)* **149.**
6086 Smart Alarms *(9-15 users)* **199.**
6085 Smart Alarms *(16-25 users)* **299.**

No Hidden Charges.



Financial Sense. Not Nonsense. Find out where your money went with **Dollars and Sense.** This personal finance program tracks your money *and* helps manage it. The necessities—like double-entry bookkeeping—are handled automatically, so you can spend your time examining the whys and what-ifs of your financial world. New in version 5.0 are custom check layouts, adjustable fonts, support for three checkbooks, more charts and graphs, and an even easier-to-use icon interface. At last you can easily track your financial past, present, *and* future.

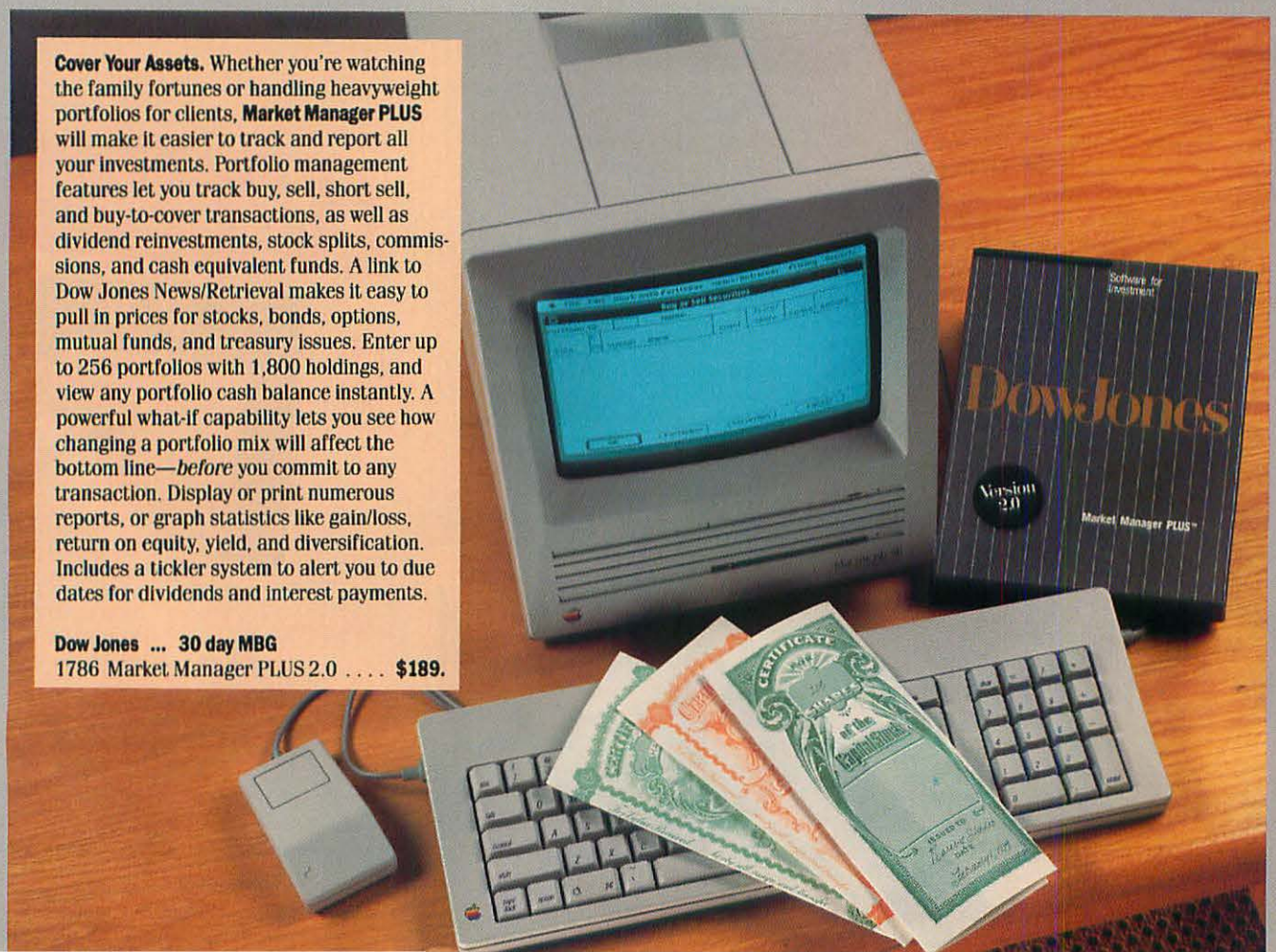
Monogram ... 30 day MBG

2780 Dollars and Sense 5.0 **$81.**

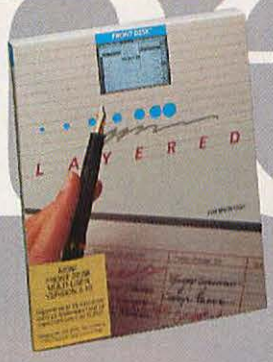
Cover Your Assets. Whether you're watching the family fortunes or handling heavyweight portfolios for clients, **Market Manager PLUS** will make it easier to track and report all your investments. Portfolio management features let you track buy, sell, short sell, and buy-to-cover transactions, as well as dividend reinvestments, stock splits, commissions, and cash equivalent funds. A link to Dow Jones News/Retrieval makes it easy to pull in prices for stocks, bonds, options, mutual funds, and treasury issues. Enter up to 256 portfolios with 1,800 holdings, and view any portfolio cash balance instantly. A powerful what-if capability lets you see how changing a portfolio mix will affect the bottom line—*before* you commit to any transaction. Display or print numerous reports, or graph statistics like gain/loss, return on equity, yield, and diversification. Includes a tickler system to alert you to due dates for dividends and interest payments.

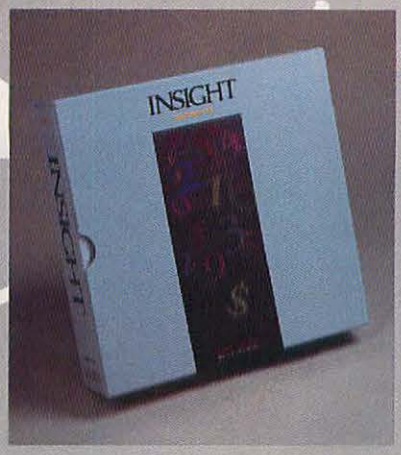
Dow Jones ... 30 day MBG

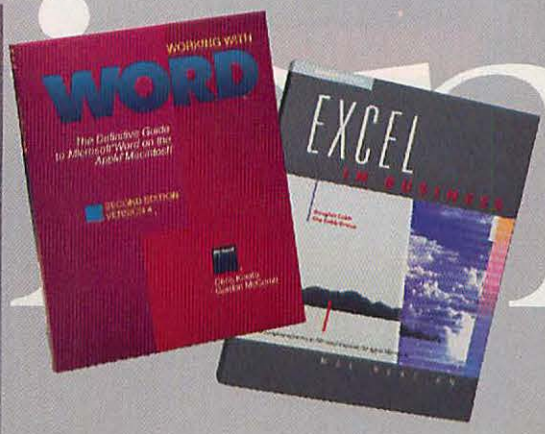
1786 Market Manager PLUS 2.0 **$189.**



DAILY BUSINESS







Resource Management. If you have places to go to, and people to see, you need **Front Desk**, a comprehensive office scheduler that lets you create multiple 12-month calendars with up to 30 resources each—people, conference rooms, delivery trucks, whatever you need to schedule. Great for any business that tracks and schedules by time: dentists, dispatchers, doctors, lawyers, and Indian chiefs. Also tracks the revenue from each scheduled appointment. It sets up easily and can support up to 25 workstations, simultaneously entering information and viewing calendars.

Layered ... 30 day MBG
2608 Front Desk Multi-User *(single node)*. **$59.**
6372 Front Desk Multi-User *(1-3 nodes)*. . **134.**
6373 Front Desk Multi-User *(1-10 nodes)*. **299.**

Once Is Enough. With Layered's **Insight OneWrite** accounting system, there's no need to duplicate your financial efforts. Based on the popular pegboard setups used by many small businesses, Insight OneWrite has A/R, G/L, and Cash Disbursements elegantly combined into one simple-to-use package. It includes journal capacities limited only by disk space, a full complement of reports, and automatic posting of bank deposits from A/R to cash disbursements. Plus, it even looks like a pegboard system. Now everything you need for small business accounting is in one place.

Layered ... 30 day MBG
2613 Insight OneWrite 1.0. **$85.**

Learn Microsoft By The Book. With 900 pages of explanations, examples, step-by-step tutorials, and tips, **Excel in Business** will vastly improve your productivity. It's completely updated to version 2.2. And for you writers, **Working With Word** will take you past simple word processing into the full power of *Word* 4.0. It features in-depth instruction on customizing menus, integrating graphics, working with lists and columns, and much more. **Microsoft Excel Money Manager** has ready-to-use templates and macro sheets for tax planning, managing credit cards, monitoring income and expenses, developing a budget, and much more.

Microsoft Press
2864 Excel in Business **$18.**
4056 Working with Word **18.**
6500 Excel Money Manager **25.**

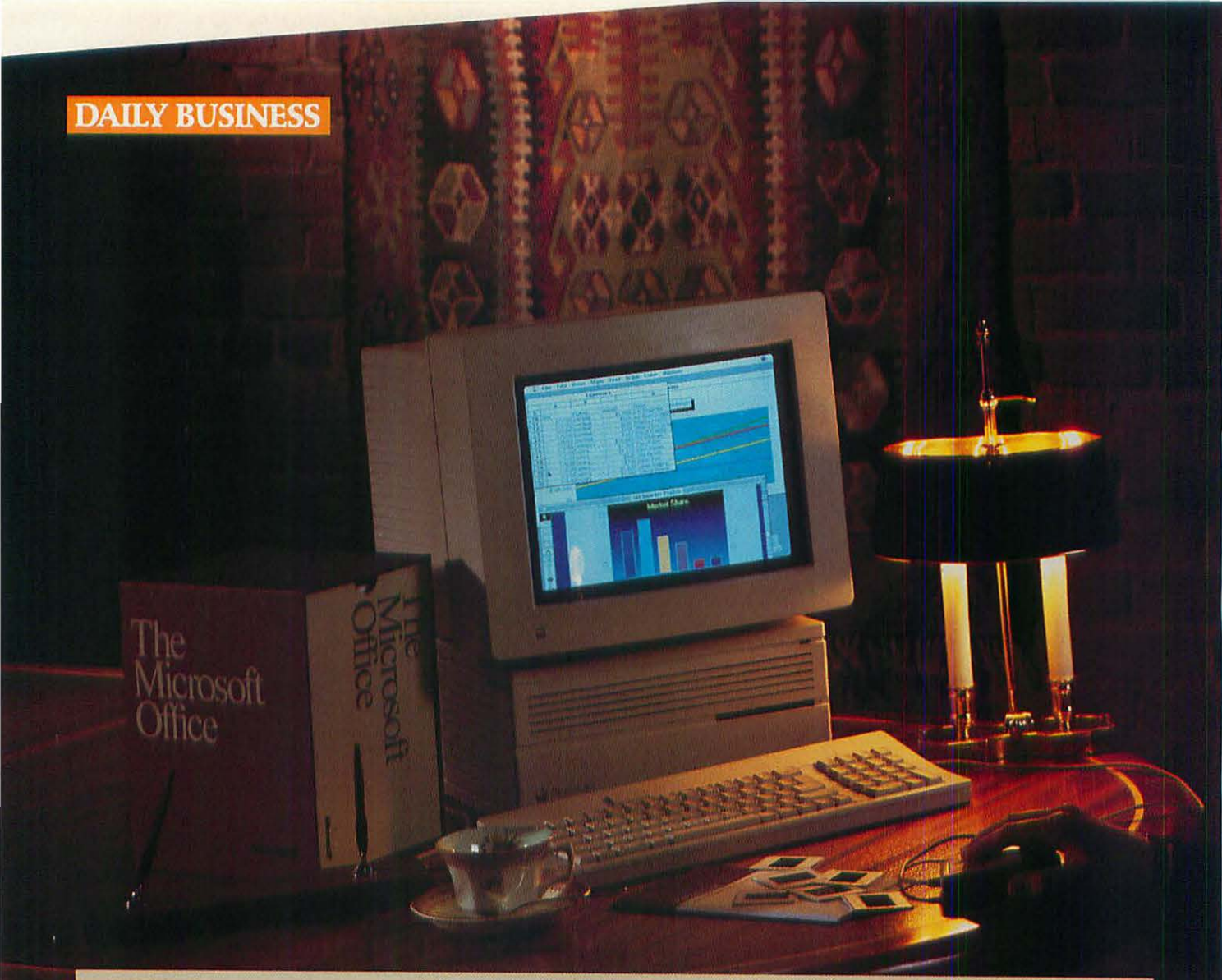
Call 1-800/334-4444 to Order.



Settle Your Accounts. Working with **atOnce!** is like having a CPA in a box. All four major accounting modules—G/L, A/R, A/P, and Payroll—work in the type of harmony you haven't seen since the last Partridge Family concert. Keep all four modules open *at once* (get it?) and easily move from one area to another for high-speed, hands-on volume data entry. An instant look-up feature lets you search for (and instantly find) any account, customer, vendor, and employee—and all look-up windows can be open simultaneously. For complex data runs, atOnce! operates in true background mode under MultiFinder, including the report queue. Total flexibility for data input and output, and a 3-part HyperCard learning set with an interactive tutorial makes it easy to start settling all your accounts atOnce!

Layered ... 30 day MBG
5207 atOnce! 1.01. **$285.**

DAILY BUSINESS



EVERYTHING YOU NEED TO GET DOWN TO BUSINESS.

Executive Spread. When it comes to Mac spreadsheets, **Microsoft Excel** is the *overwhelming* favorite. Why? Because this high-powered spread can slice and dice numbers any way you want 'em. Version 2.2 can tap up to 8MB of RAM to let you build spreadsheets large enough to run something as big as, say, Texas. And its superb analytical tools will let you turn "what-if" into "here's what we should do." Powerful Macro facility, database and information management features, and the presentation tools to make your numbers look incredible, too. Choose from hundreds of fonts, dozens of charts and graphs, and share data with other Microsoft applications, or even *1-2-3*. The bottom line will be looking *very* good.

The Power Of The Word. Writing is difficult enough. The last thing you need is to struggle with a less-than-perfect word processor. That's why the first thing you need when it's time to put your ideas on paper is **Microsoft Word**. The Mac's heavyweight word processing champion is still easy enough for beginners. And it's the winner of the 1989 Eddy from *MacUser* as Best Word Processor. No matter what type of document you're working on, Word will make your ideas look their best. Version 4.0 has an all-star array of powerful features. Create multi-column tables easily, customize any menu to your liking, and take advantage of page-layout features like absolute positioning of graphics or text as well as Word's famous style sheets. Naturally, you get a true WYSIWYG display. But you also get a 130,000-word spelling checker, 220,000-word thesaurus, and *AutoMac III*, to make a macro out of any procedure. Plus, with *QuickSwitch*, you can automatically update graphics, tables, or text from programs like *Excel*, *SuperPaint*, and others.

Make A Convincing Point. When you use **Microsoft PowerPoint**, you'll *never* see anyone yawn during your presentations again. PowerPoint can turn out typeset-quality overheads and flipcharts (black and white or color), color slides, and even on-screen slide shows. It creates three formats of audience handouts and speaker notes automatically, and includes a thorough word processor, a complete set of graphic tools, and support for all 16.8 million Mac II colors (you should be able to squeak by with those). They'll think you had a staff of artists on your side and weeks of time. You don't *have* to tell them you did the whole thing at your desk during lunch hour.

Microsoft ... 30 day MBG

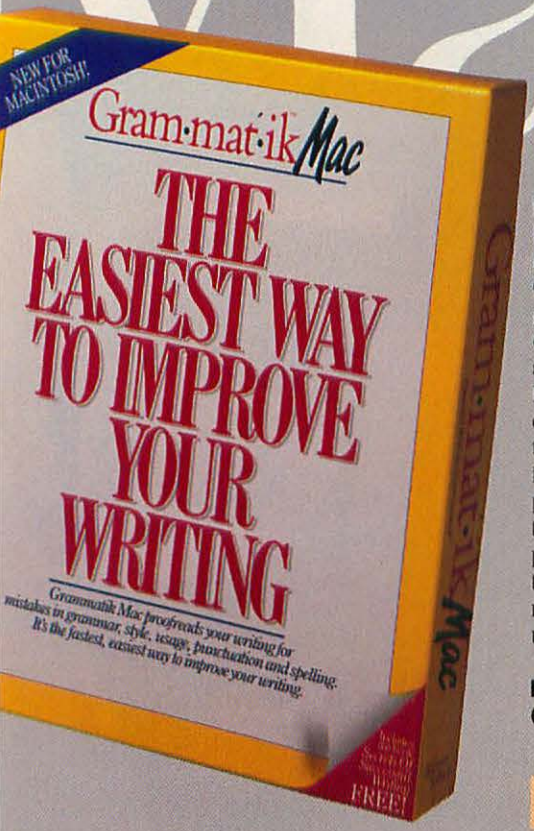
4969	Word 4.0	$249.
2865	Excel 2.2	249.
2878	PowerPoint 2.01	249.
5858	Microsoft Mail 2.0 Workstation	84.
5856	Microsoft Mail 2.0 Server	249.
5857	Microsoft Mail 2.0 *(20 Pack)*	969.
5454	The Microsoft Office *(includes Word 4.0, Excel 2.2, PowerPoint 2.01, and Mail 2.0)*	529.
6382	The Microsoft Office *(CD-ROM)*	599.



Be Open To Others. Receive the world without ever leaving your desk. **Microsoft Mail** can handle all your internal and external communications. Send and receive almost anything—messages, faxes, documents, you name it. Mail will sort messages by both category *and* order of receipt. It includes its own forms capability, group distribution lists, and more. Mail supports both Macs and PCs, works with numerous network systems, and can gateway to MCI Mail, PROFS, VMS Mail, and many other systems. Plus, it sends and receives seamlessly with *Excel* 2.2 and *Word* 4.0. Won an Honorable Mention as Best Communications Product in *MacUser's* 1989 Eddy Awards.

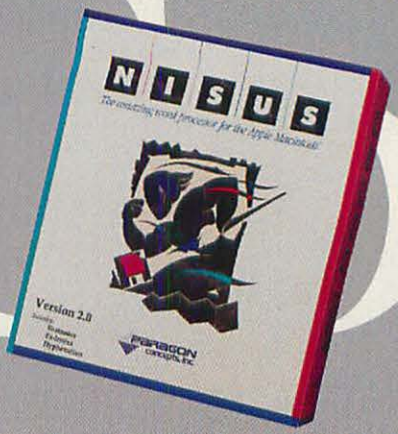
Executive Suite. Nothing puts it all together like **Microsoft Office**. Get four powerhouse Microsoft programs—*Word* 4.0, *Excel* 2.2, *PowerPoint* 2.01, and *Mail* 2.0 for total business productivity. You get number crunching, word wizardry, punchy presentations, and complete communications. The CD-ROM version adds on-line documentation for all the programs, animated introductions to key program features, and third-party enhancements including templates, applications, clip-art, and more. Either way, you get it all in one package and at a special price. Which seems like a great way to demonstrate some business sense.

Call MacConnection 1-800/334-4444 to Order.



Never Dangle Another Participle. If you think the Dangling Participles are a '60s band from San Francisco, do you ever need **Grammatik Mac** bad (I mean badly). This powerful grammar checker can make a big difference in your writing style, as well as save you from some serious embarrassment. Detects thousands of writing errors (a week's output for Quayle speechwriters), tells you the problem, and allows you to correct it immediately or ignore the suggestion. Make passive voice, split infinitives, poor punctuation, and lots of other mistakes things of the past. It even lets you customize its operation to fit your writing needs and works with most popular word processors and all unpopular writing.

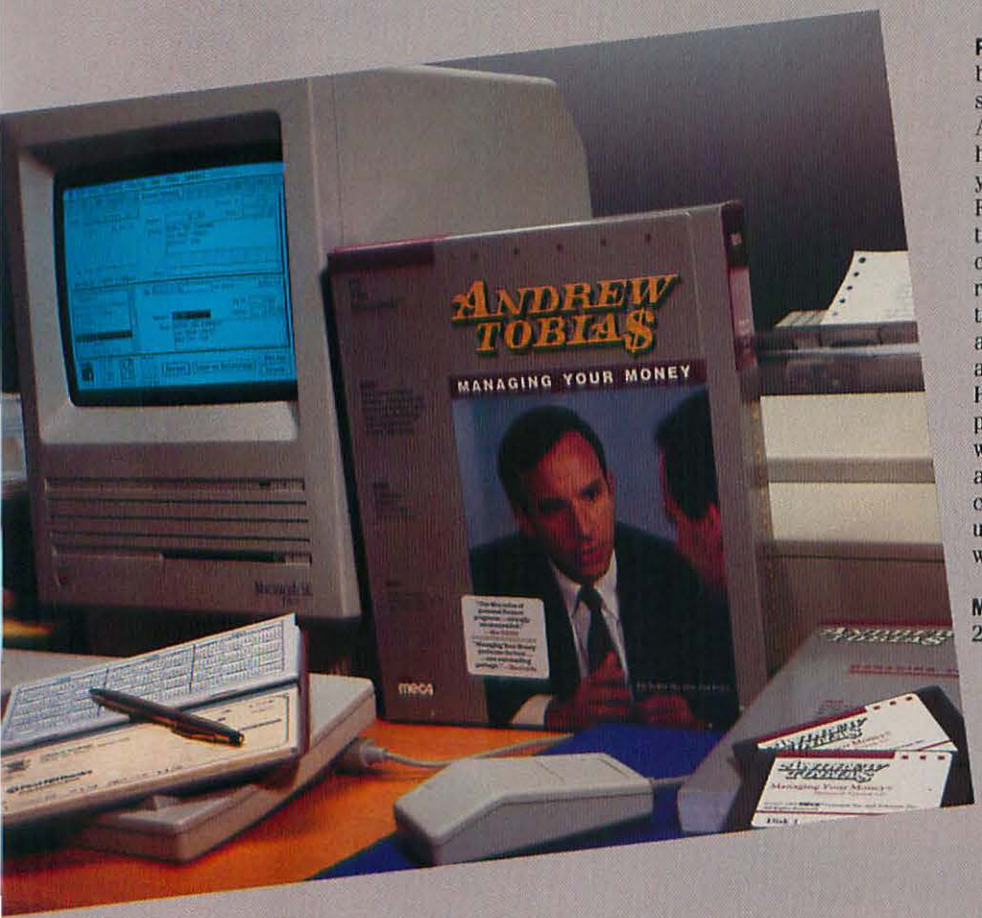
Reference Software ... 30 day MBG
6268 Grammatik Mac 1.0 **$51.**



Serious Word Power. With **Nisus**, even the most power-hungry word processing users will be sated. *Macworld* (9/89) said it "might have the longest list of features of any word processor." There's a search and replace to die for (it will do so even in unopened files), and there's a multiple undo that can rescind your last 32,767 actions. Find specific fonts, type sizes, or even colors. Plus ten editable clipboards, a macro recorder, powerful text-editing, integrated graphics drawing, a spell checker, thesaurus, and much more. If you can do it with words, you can do it with Nisus.

Paragon Concepts ... 30 day MBG
5683 Nisus 2.03 **$249.**

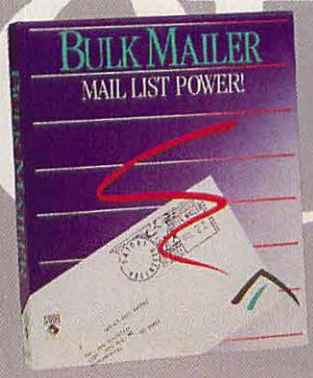
30/60 Day Money-Back Guarantee.



Personal Financial Advice. Anytime. Are you so busy making money that you have no time to spend managing it? There is help. With Andrew Tobias' **Managing Your Money**, you'll have all your taxes tied up, all the stats on your stocks, and all your ducks in a row. Financially, that is. MYM takes the toil out of tracking your financial worth. It features a complete budget and checkbook program, records and analyzes all your stock and bond transactions, estimates your life expectancy and insurance needs, tracks your net worth, and much more. What else is there, you say? How about retirement planning, college planning, mortgage refinance analysis, and what-ifs for all types of investments? Includes all the new tax laws and changes. Plus, you can print all kinds of reports, and it's easy to use. Spend more time making money, not wondering where it went.

MECA ... 60 day MBG
2796 Managing Your Money 3.0. **$124.**





Accounting For Individualists. Mailings For Everyone. Flexible accounting software is usually an oxymoron. Not with **Components General Ledger** and **Accounts Receivable**. This accounting construction kit provides *total* freedom to build an accounting system that matches your business and the way you like to run it. Use the templates, or define your own setup, with either double entry or automatic offset format. Robust desktop publishing tools create forms and reports that say it your way. The A/R package tracks customers, items sold, and receivables, and prints any type of invoice or statement. For generating even more receivables, try Satori's **BulkMailer** (8,600 names per list) or **BulkMailer Plus** (90,000 names per list). It's an extremely full-featured mailing list manager with duplicate search, code fields, and mail-merge capability.

Satori Software

3978	Components G/L 1.0	**$369.**
6109	Components A/R 1.0	**369.**
3320	BulkMailer 3.25	**75.**
3321	BulkMailer Plus 3.25	**179.**

No Sales Tax.



Word Processing. With Personality. If you edit text there's nothing like **Vantage**. It lets you do things many word processors don't, like edit up to 16 different windows at once, change the case of a document, sort sentences and paragraphs, create macros, and much more. Plus, it's a DA. So it's always there, ready to polish your prose in any program. Want to add some **Personality!** to your system? This collection of six CDEVs offers complete customization of your Mac's interface. Includes: Soundz!, Kolorz!, Menuz!, Controlz!, Windowz!, and Kursorz!

Preferred Publishers ... 30 day MBG

4781	Vantage 1.5	**$52.**
6656	Personality!	**49.**

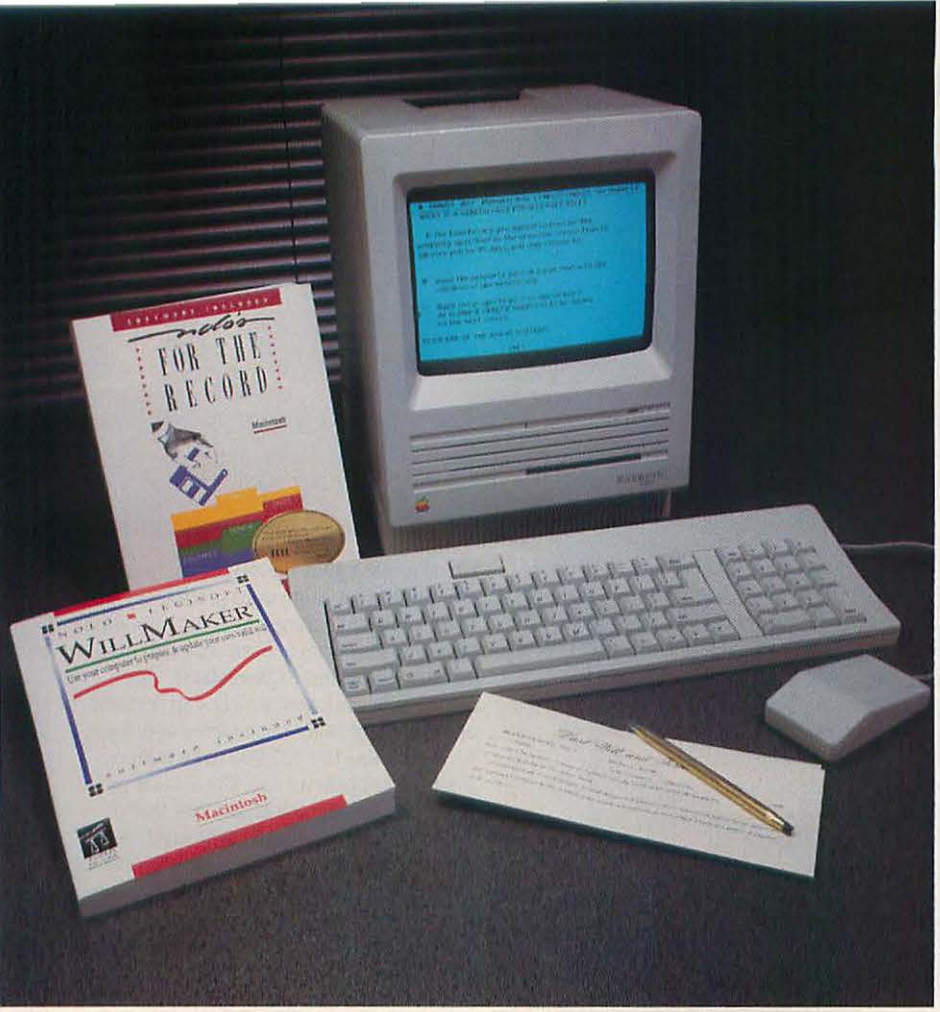
Word Processing For The Rest Of Us. Did you ever notice that some word processors are so burdened with features that contemplating your next move can become an existential dilemma? Now there's **WordMaker**, which balances serious word processing performance with a friendly, uncluttered approach. By eliminating the 125,000 or so features you'll probably never use, WordMaker is sleek, fun, and lightning fast. Not that it lacks power: there's a 100,000-word spell checker, super-flexible formatting, great printing control, up to ten documents open at once, and some killer graphics abilities. Place a picture anywhere on a page, wrap text around it, re-size it, or even print text over it. And it read/writes *MacWrite* and Text files, works under MultiFinder, and is compatible with AppleShare and *TOPS*. All this, and the manual is under 100 pages. Think of it as a Bauhaus word processor, and see why *MacUser* (10/89) said, "WordMaker is a winner."

New Horizons ... 30 day MBG

6262	WordMaker 1.0.1	**$65.**



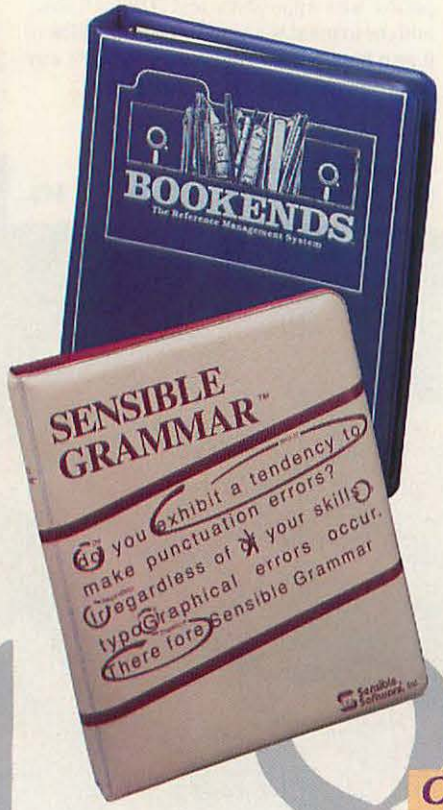
Call 1-800/334-4444 to Order.



Get Organized At Last. Do you know where all your vital personal records are? In some shoebox, maybe? Check out **For The Record**, the easy way to store and retrieve all your important statistics: tax records, medical information, credit card numbers, real estate, and much more. For The Record's database of 27 categories and more than 200 sub-categories will make it easy to organize your records and then keep it all together. And with **WillMaker** you can keep your affairs in order in perpetuity, because it can help you create and update a valid will, making appropriate legal adjustments for your state (of residence, that is. Note: not valid in Louisana). WillMaker creates a personalized will based on your answers to on-screen questions. The 200-page manual includes an overview of probate avoidance and tax planning techniques. As *MacWEEK* (6/89) said, "the results will be worth it." According to the same source, both products come with manuals that "teem with advice." Don't delay—prepare every which way for now and forever.

Nolo Press ... 60 day MBG
4228 For The Record 1.03 **$28.**
2981 WillMaker 3.0 **32.**

Overnight Shipping $3.

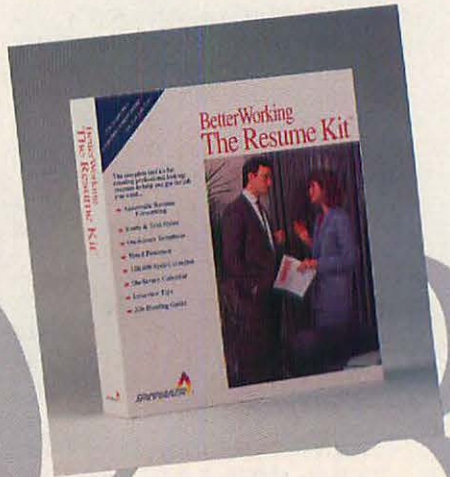


Annotation. Punctuation. Liberation. With **Bookends** you can create your own HyperCard reference database and then just browse word processing documents to create bibliographies and footnotes in any style you choose. Plus, it lets you directly import references from many popular national online databases. **Sensible Grammar** keeps your English looking as good as your annotations. It works with most word processing documents, and checks grammar, punctuation, and phraseology (it knows over 4,000 often-misused phrases). And it's useful for anyone from refugees from high school English Class to professional writers. Because it lets you decide which types of errors will be checked. Plus you can create your own "Exception List" of words or phrases that the experts abjure, but you can't resist.

Sensible Software ... 30 day MBG
4692 Bookends 1.2 **$51.**
3375 Sensible Grammar 1.5.8 **51.**

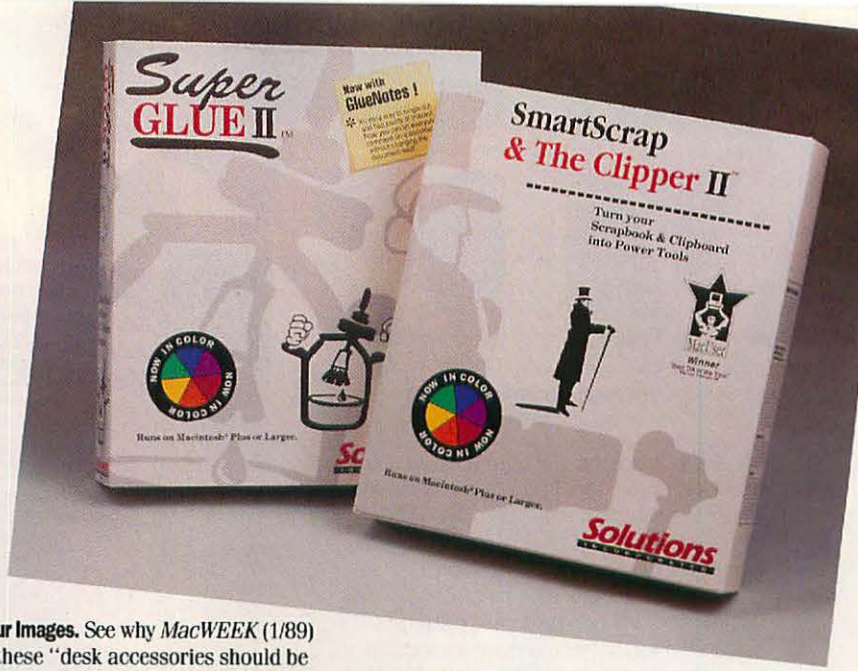
Job In A Box. Smooth out the job-hunting jangles with **The Resume Kit**. Inside the box is everything you need to write, format, and print a super-looking resume and cover letter in under an hour. Just add a Mac and your qualifications. Choose from nine resume types, and then simply fill in the on-screen forms. Includes a word processor and spell checker for follow-up letters, and a calendar system to track appointments, call backs, and interviews.

Spinnaker ... 30 day MBG
6508 The Resume Kit **$35.**



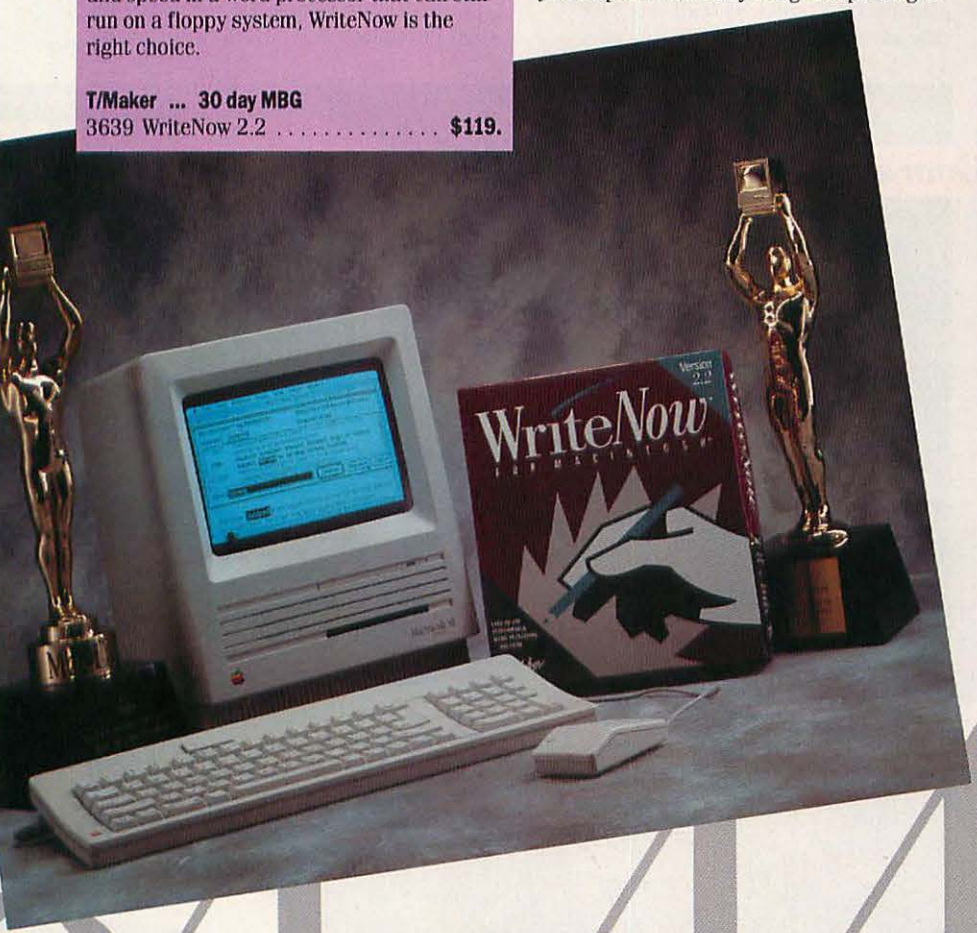
Call MacConnection to Order.

1-800-3



Still Easy. Still Fast. Still The Right Choice. T/Maker's **WriteNow** now includes the 1.4 million-word *WordMaster Thesaurus* by Proximity and a 135,000-word spell checker, both the largest currently found in any Macintosh word processor. The word processor that has twice been called the Best New Word Processor (*MacUser* 5/89, 5/87) and Readers' Choice (*MACazine* 1/89) also includes over a dozen new features and direct *Word* 3.0 and *Word* 4.0 compatibility. When you combine these new features with WriteNow's WYSIWYG editing, multiple-column capability, and mail merge, you have the word processor of choice in the Macintosh world. In fact, it was the #1 Rated Macintosh Word Processor in the *PC Week* Poll of Corporate Satisfaction. WriteNow has also been acclaimed by respected industry columnists such as John Dvorak of the *San Francisco Examiner* who writes, "It's the only word processor that I actually enjoy using." And James Finn of *MacUser* proclaims, "In short, the best word processor got even better, and, priced as it is, WriteNow is almost a public service." If you need an elegant combination of simplicity, power, and speed in a word processor that can still run on a floppy system, WriteNow is the right choice.

T/Maker ... 30 day MBG
3639 WriteNow 2.2 **$119.**



Improve Your Images. See why *MacWEEK* (1/89) said that these "desk accessories should be owned by every desktop publisher." With **SuperGlue II** you can transform almost any image into a PICT, Scrapbook, or ASCII file that can be read by anyone, *even if they don't have the same software or fonts.* You can even extract text and numbers from PICT images for use in your word processor and spreadsheet. **SmartScrap** one-ups Apple's Scrapbook, by allowing multiple scrapbooks to be stored anywhere, while **The Clipper** lets you crop and scale any image for pasting to other applications. You get full color support along with a unique bitmap lasso and marquee selection tool.

Solutions, Inc. ... 60 day MBG
3449 SuperGlue II 2.01 **$61.**
3448 SmartScrap & The Clipper II 2.1 . . **45.**



Seize Control Of Your Financial World. Are your finances out of control? **MacMoney**, the award-winning personal finance program, can put things in order fast. Truly easy to use—you just point and click to write a check. It features 250 user-defined categories, name/address lists, many reports, and loan and retirement planning. And it balances all your accounts, including credit cards, credit lines, and mortgages—not just your checkbook. Business users can add **InvoicIt** to print invoices and track client balances. Supports color monitors.

Survivor Software ... 30 day MBG
3289 MacMoney 3.5 **$59.**
6097 InvoicIt 1.01 *(requires MacMoney)*. **49.**

No Hidden Charges.



Get All The Jobs Done. Here are some XFCNs from SoftStream that bring HyperCard a lot closer to productive perfection. **HyperHIT** extends the power of HyperCard by creating structured files in which data is retrieved in fractions of a second. Anyone who has dealt with HyperCard's sluggish card retrieval system knows that as a serious database it is severely limited. HyperHIT solves that problem with keyed files that support PICT and .snd resources, and strings greater than 32K. Get more hyper-power with **Authenticate & Mutate**. Authenticate makes it easy to authenticate fields with a single function call, especially useful when editing complex identification strings. Mutate can format or transform any field's contents, and drastically reduce scripting code needed to give fields a consistent, professional appearance. Also from SoftStream, **Endeavour Planner** lets you plan and track projects via a very clean, simple, and fully graphical interface. You work directly with a Gantt chart to enter data, and to set dependencies between tasks, milestones, and task durations. For publishers, **UltraSpec** streamlines production planning by determining word, line, and character counts.

SoftStream Int'l., Inc. ... 30 day MBG

5440	HyperHIT 2.2	**$125.**
6513	Authenticate & Mutate	**79.**
5439	Endeavour Planner 1.0	**95.**
4996	UltraSpec 1.0	**95.**

30/60 Day Money-Back Guarantee.



The Well-Rounded Flat File. A flat-file database manager doesn't have to be one dimensional. **Panorama** does so many things you could think of it as the Bo Jackson of flat files. Panorama knows list management, Panorama knows drawing, Panorama knows mail merge, and much more. *MacUser* (11/89) called it the "most visual flat-file manager on the market." It uses a spreadsheet-like screen for easy data entry, and you can work with form and spreadsheet views simultaneously. Open up to 25 windows/databases at once, and with your entire database in memory it's super fast, too. It can record macros, and has great built-in charting and graphics—which make forms design easy. Use pictures in a database with its Flash Art gallery, and import data from *FileMaker*, *Excel*, *4th Dimension*, or *Double Helix*. *MacWEEK* summed up by saying that Panorama "has power that the other programs in its class have yet to top."

ProVUE ... 60 day MBG

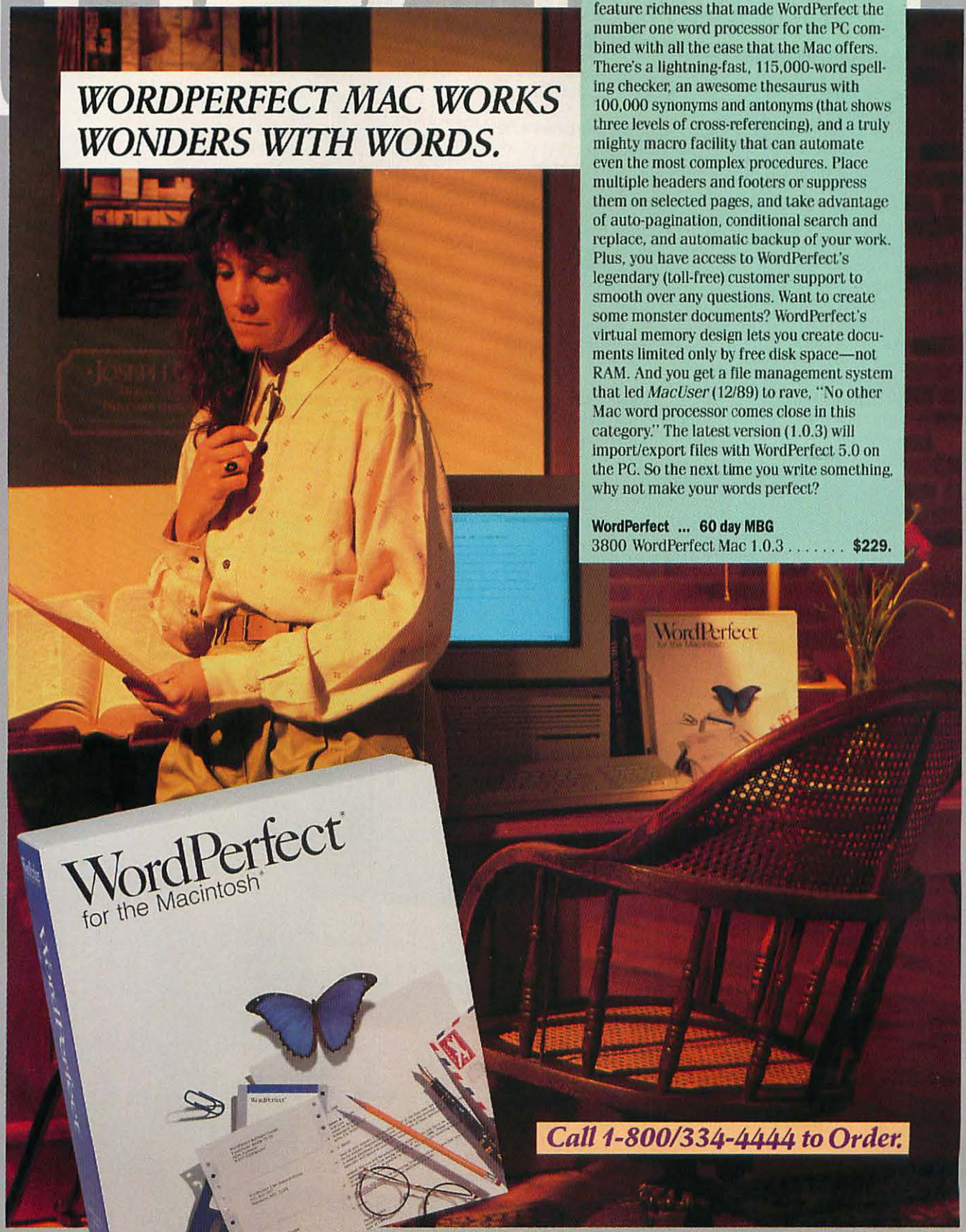
4582	Panorama 1.5	**$249.**

No Hidden Charges.

WORDPERFECT MAC WORKS WONDERS WITH WORDS.

Buy A Little Perfection. Your words are important to you. Doesn't matter if it's a business proposal or that thesis on Heidegger—you want 'em perfect. **WordPerfect**. You get all the feature richness that made WordPerfect the number one word processor for the PC combined with all the ease that the Mac offers. There's a lightning-fast, 115,000-word spelling checker, an awesome thesaurus with 100,000 synonyms and antonyms (that shows three levels of cross-referencing), and a truly mighty macro facility that can automate even the most complex procedures. Place multiple headers and footers or suppress them on selected pages, and take advantage of auto-pagination, conditional search and replace, and automatic backup of your work. Plus, you have access to WordPerfect's legendary (toll-free) customer support to smooth over any questions. Want to create some monster documents? WordPerfect's virtual memory design lets you create documents limited only by free disk space—not RAM. And you get a file management system that led *MacUser* (12/89) to rave, "No other Mac word processor comes close in this category." The latest version (1.0.3) will import/export files with WordPerfect 5.0 on the PC. So the next time you write something, why not make your words perfect?

WordPerfect ... 60 day MBG
3800 WordPerfect Mac 1.0.3 **$229.**



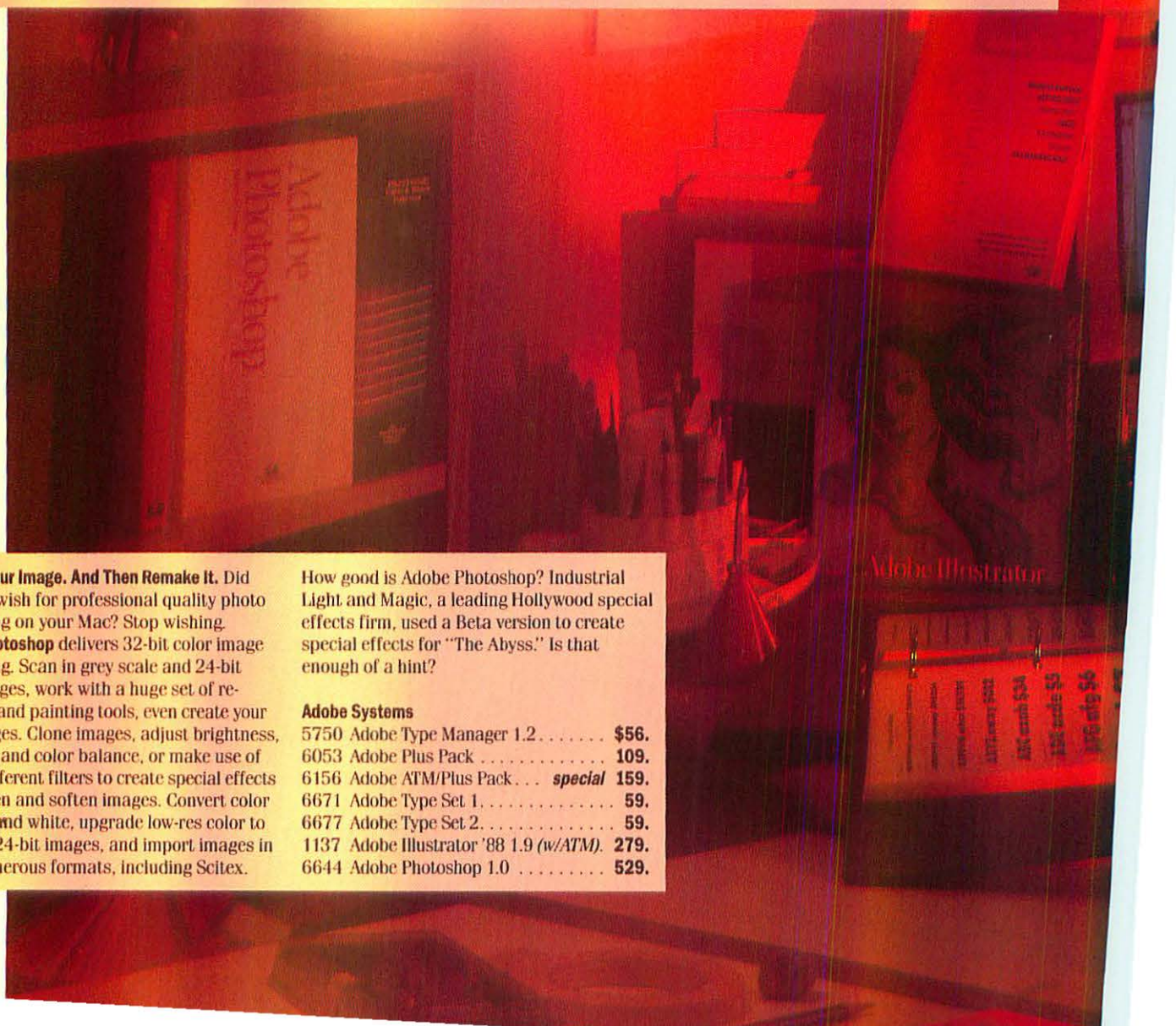
Call 1-800/334-4444 to Order.

REVEAL YOUR MAC'S TRUE TYPE AND GRAPHIC POTENTIAL.

It's Time To Lose Your Edge. Well, to be exact, the edges on your screen. Which is exactly what you can do with **Adobe Type Manager**. This extraordinary product smoothes out the jagged edges of your type, generating super-smooth printer output *and* smooth screen bitmaps, too. Sound incredible? *MacUser* thought so, giving it honors in *three* different 1989 Eddy Award categories, including Most Significant Software Product. Based on Adobe's PostScript language, ATM software installs in a jiffy, and only needs a single megabyte to do its magic. It comes with 13 resident fonts, and supports most Type 1 fonts—so you can scale tons of type to just about any size without jagged edges. Plus you don't need an expensive laser printer to get high-quality printing—ATM will turn out smooth, beautiful copy on your ImageWriter, HP DeskWriter, or other QuickDraw device—even fax machines. Start losing your edge today. You'll feel better.

Hang Out With Different Types. Once you experience the power of *Adobe Type Manager*, you'll be ready to see some new faces. A great way to do that is with the *Adobe Type Set* font packages. Each one contains seven display fonts at a great price. And they're designed to look great at large point sizes. **Adobe Type Set 1** contains beauties like the elegantly sculpted Trajan typeface and the informal Freestyle Script. **Adobe Type Set 2** has workhorse fonts including Cooper Black, Peignot Demi, and Copperplate Gothic. Naturally, they both work perfectly with Adobe Type Manager, so you get smooth type on screen and on paper—even from low resolution output devices. Find out how rewarding it can be to try a new type.

Graphic Possibilities. Looking to express yourself graphically? **Adobe Illustrator '88** can help. This powerful graphics tool can do it all—from simple charts and graphs to the most complex technical illustrations, and just about everything in between. The rich set of graphics tools include superb freehand drawing (with Bezier curves), an auto-trace tool for turning scanned images into editable artwork, and, naturally, the ability to work with Adobe PostScript typefaces. Bend, stretch, rotate, or shear your images, and use color to its fullest. You can produce camera-ready proofs, generate color separations, turn out 3D or airbrush effects, and even spec out Pantone colors. It's truly the art of illustration at its most graphic. And for a limited time, Illustrator '88 comes bundled with ATM software.

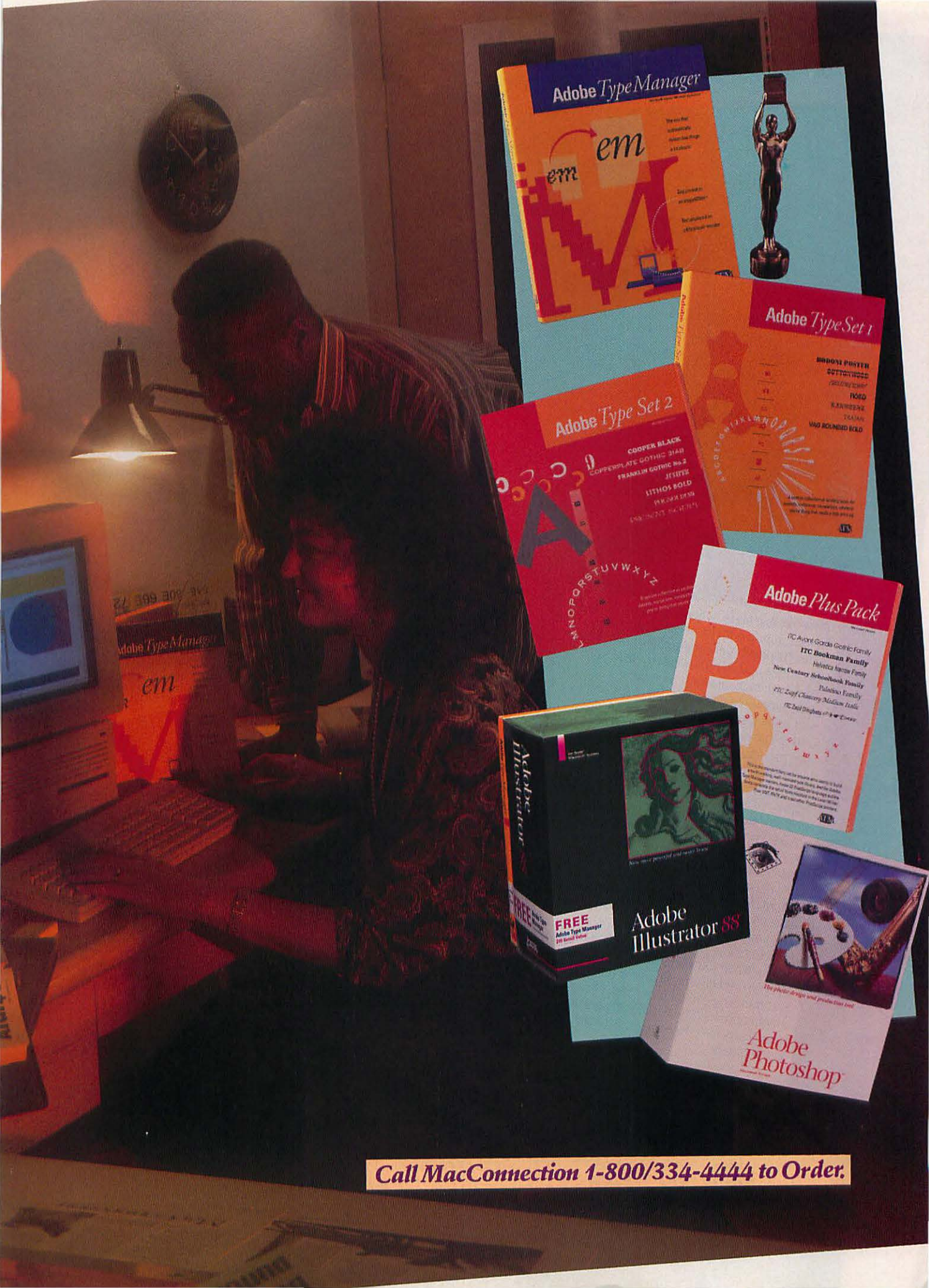


Control Your Image. And Then Remake It. Did you ever wish for professional quality photo retouching on your Mac? Stop wishing. **Adobe Photoshop** delivers 32-bit color image processing. Scan in grey scale and 24-bit color images, work with a huge set of retouching and painting tools, even create your own images. Clone images, adjust brightness, contrast, and color balance, or make use of the 21 different filters to create special effects or sharpen and soften images. Convert color to black and white, upgrade low-res color to high-res 24-bit images, and import images in from numerous formats, including Scitex.

How good is Adobe Photoshop? Industrial Light and Magic, a leading Hollywood special effects firm, used a Beta version to create special effects for "The Abyss." Is that enough of a hint?

Adobe Systems

5750	Adobe Type Manager 1.2	**$56.**
6053	Adobe Plus Pack	**109.**
6156	Adobe ATM/Plus Pack	***special*** **159.**
6671	Adobe Type Set 1	**59.**
6677	Adobe Type Set 2	**59.**
1137	Adobe Illustrator '88 1.9 *(w/ATM)*	**279.**
6644	Adobe Photoshop 1.0	**529.**



Call MacConnection 1-800/334-4444 to Order.

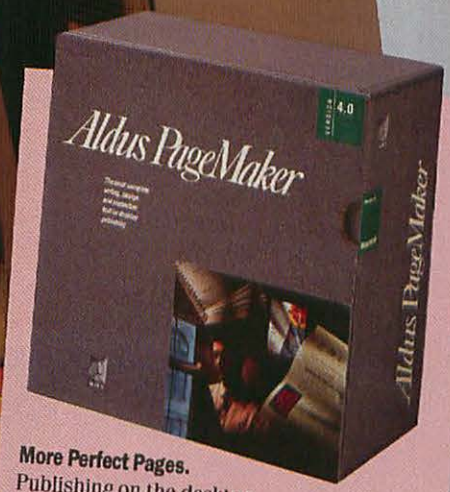


Draw Out Your Ideas. When it comes to graphic design, your creativity needs a free hand. **Aldus FreeHand**. You get graphics power from the simple to the sophisticated. Draw your ideas with high-quality bezier curve technology—or erase your way back over your path. Use the auto-trace tool, blend colors, and create custom fills. Take advantage of tiling, which lets you turn any captured area into a repeating background fill. Naturally, you'd expect some praiseworthy type control from the company that virtually *invented* desktop publishing, and you get it. Create curved text, rotate or stretch your type, and choose from a wide selection of fonts. Use FreeHand to design letterheads, ads, illustrations, logos, and more. For color output, FreeHand supports the printing industry standard PANTONE color system. And unlike some illustration programs, FreeHand lets you see *all* your changes on screen *while* you work; whether you're using the powerful graphics tools or the incredible text handling capabilities. And, of course, anything you create with FreeHand dovetails seamlessly into *PageMaker*. After all, it's all in the family.

Aldus ... 30 day MBG
1330 FreeHand 2.02 **$329.**

Call MacConnection 1-800/334-4444 to Order.

A COMPLETE DESIGN STUDIO INSIDE YOUR MAC.



More Perfect Pages.
Publishing on the desktop just moved up a notch, thanks to the new and improved **Aldus PageMaker**. This latest version, 4.0, adds over 75 new features and enhancements to what was already a smash hit. What's new? How about a built-in word processor with a story editor. It pops up a text-only window so you can enter text as quickly as you could with most word processors. Then simply reflow the new text into any location you choose. Typographic control has been enhanced, with point-size-dependent tracking. What does that mean? It means you can control the look of your page, making it more or less dense (or gray) by tightening or loosening the spacing. If you work with color, version 4.0 includes all the color features first introduced in *Color Extension*, like PANTONE support and the ability to output 4-color separations. Plus, you can now print color comps to all kinds of different output devices. Want to be more impressed? Alright: it has the ability to check spelling and hyphenation in 11 different languages. At once. (With the purchase of optional foreign language dictionaries.) Plus there are more long-document features, a table creation editor, the ability to assign type from 4 to 650 points, and a whole lot more added to all the features that made version 3.0 so popular. Put the power of publishing in *your* Mac.

Aldus ... 30 day MBG
1331 PageMaker 4.0 **$499.**

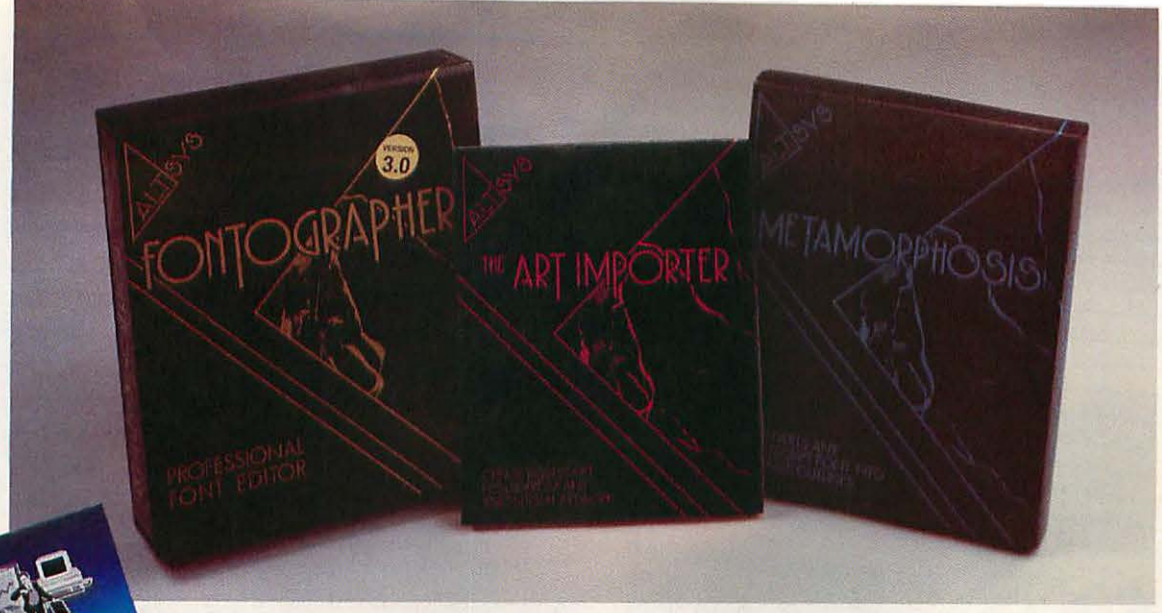
YOU CAN BE SO CONVINCING!

State Your Case With Persuasion. What's the best way to persuade your audience? Use **Aldus Persuasion**, the presentation program that will have you winning friends and influencing people in no time. Persuasion lets you put your message across in many ways—with 35mm slides, overheads, printed handouts, and more. Plus, *anyone* can create a presentation with Persuasion, because Persuasion comes with built-in templates that help streamline and automate the whole process. Using Aldus' revolutionary AutoTemplate technology, you can select a template, type your text into the outliner, and voila—instant presentation. There are a total of 36 template designs to choose from. If you want to start from scratch you can use the built-in word processor, drawing, and charting tools. Select fonts and type sizes, harness 200 color palettes from the 16.8 million Mac II colors, and take advantage of the support for Apple's 32-bit color standard. Import/Export data with many leading programs, and print to most any PostScript or QuickDraw printer. In fact, this program is so persuasive that it won several awards including *Publish* magazine's Best Presentation Graphics Product for 1989. So next time you need to make a case, do it with a little heavy persuasion.

Aldus ... 30 day MBG
4751 Persuasion 2.0 **$329.**



Call MacConnection 1-800/334-4444 to Order





Typographical Transformations. Sometimes finding just the right type is so difficult, you wish you could design one yourself. With **Fontographer**, you can. This specialized graphics editor lets you create your own high-quality fonts and other PostScript artwork— either from scratch or beginning with a scanned image or font template. Features include an auto-trace tool to outline scanned images, automatic generation of PostScript and bitmap "hints," and an integrated bitmap font editor. To design custom logo fonts, use **The Art Importer**. It creates high-resolution PostScript fonts from almost any Mac artwork. Import images in EPS, PICT, or PICT2 formats from most leading drawing programs. Then let The Art Importer automatically create screen and PostScript font files, so you can add artwork to documents as easily as selecting a character. And **Metamorphosis** is a spiffy utility that converts any printer resident PostScript font into an editable outline format. The outlines can then be used not only in Fontographer, where you can make each character letter perfect, but also in *FreeHand*, *Illustrator*, and more.

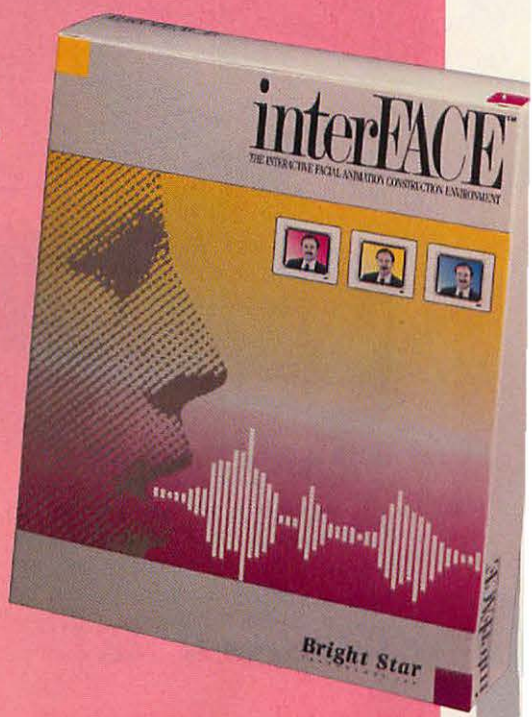
Altsys
1195 Fontographer 3.0.5 **$249.**
5425 The Art Importer 2.0 **89.**
6499 Metamorphosis 1.0 **149.**

Clip-Art Masterpieces. Does clip-art have to look like it was drawn by some accountant who thinks that Louvre is French for pepper steak? Not with **Images With Impact. Graphics & Symbols 1**, **Business 1**, and **Accents & Borders 1** provide high-quality PostScript artwork, professionally created to be modified in *Illustrator* and *FreeHand*. These contemporary images are stored in EPS format, so they print at the maximum resolution of any PostScript device. And the excellent User's Guide shows how to use them most effectively in your presentations and publications.

3G Graphics
3942 Images with Impact: Graphics 1 . **$51.**
4583 Images with Impact: Business 1 . . **65.**
6379 Images with Impact: Accents 1 . . . **65.**

Give Your Applications Personalities. InterFACE expands the power of HyperAnimation, the technology that puts talking characters into applications. InterFACE characters are television-quality animated "Agents" which add power to your information kiosk, desktop presentations, computer learning aids, or any application that needs a friendlier user interface. This powerful animation tool works with *SuperCard*, *HyperCard*, *WingZ*, *FoxBase*, *4th Dimension*, *C*, *Pascal*, and any application that supports XCMDs. It imports color into *HyperCard*, and can be used as a general animation tool. This product is a must for multimedia computing in the 1990s. Comes with 8 disks containing 40 "actors," 11MB of software, 13 sample applications, and 5MB of clip-art.

Bright Star Technology
6093 interFACE 1.0 **$249.**

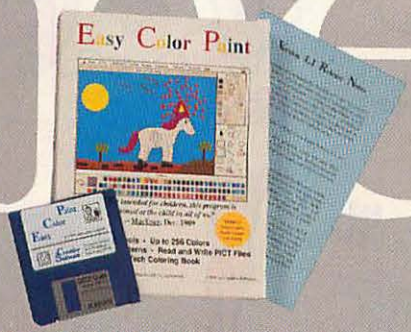




TRANSFORM EVERY LETTER INTO A WORK OF ART.

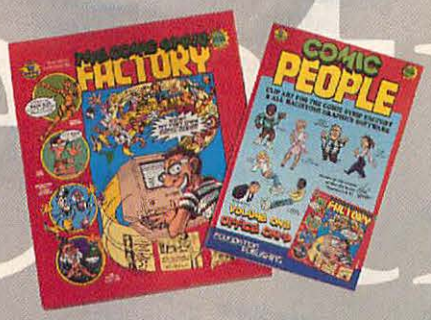
Bend It. Shape It. Any Way You Want It. Stop looking for a font with the right type effects and make them yourself. With **TypeStyler**, you can do anything to your existing type you can imagine. And things you can't. Bend it. Stretch it. Rotate it. Squeeze it. Distort it. Flip it. Want circular text? You got it. Enhance it with sunbursts, fades, and up to 256 colors. TypeStyler can create thousands of custom effects, with shadows, gradients, fills, and patterns. There's even a library of background panels that you can use as is or custom shape and style. Plus, TypeStyler can import and export EPS and PICT formats, so you can combine custom text and artwork to make incredible logos. Also great for signage, ads, packaging, letterheads, and much more. Incredibly easy to use, it's also compatible with most popular Mac drawing and desktop publishing software. You get ten *AGFA Compugraphic* typefaces in the package, and it will work with thousands of other commercially available fonts, including Type 1 fonts from Adobe and other publishers. Winner of an Honorable Mention for Best Typographic Product in the 1989 Eddy Awards (*MacUser* 3/90).

Broderbund Software
6281 TypeStyler 1.01 **$119.**



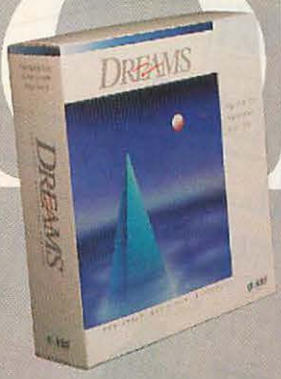
Discover The Artist Within. With **Easy Color Paint**, kids of *all* ages can indulge their creative muse. It's like having Picasso power combined with a user-friendly interface. You get 17 easy-to-use painting tools, up to 256 colors, adjustable fonts and brushes, and even black and white pictures to color in. Plus, it reads and writes PICT files so you can share your work with other programs. Whether you're 5 or 55, Easy Color Paint delivers serious painting fun—without any serious complexities.

Creative Software ... 30 day MBG
6645 Easy Color Paint 1.1 **$42.**



Serious Comic Power. With the **Comic Strip Factory**, you'll have all the tools you need to bring your own comic strips to life. Six great characters, four incredibly varied backgrounds, more than 1,400 comic parts in all. Use preset panel layouts or create your own, and use the graphic editor to work comic magic right down to the pixel level. It imports/exports MacPaint files, so your comic masterpieces can be used with most popular Mac applications. Add the **Comic People** for additional ready-to-use characters. Like the names say, Volume 1 has business comic characters, and Volume 2 features kids.

Foundation Publishing ... 60 day MBG
6728 Comic Strip Factory 1.6 **$38.**
6729 Comic People Vol. 1 *(Office Days)* . **21.**
6646 Comic People Vol. 2 *(Kid Stuff)* . . . **21.**



See Your Dreams On Screen. When you need precision drawing and design, express yourself with **Dreams**. Created by the makers of *MacDraft*, Dreams can be used for professional illustrations and general business graphics and presentations, as well as scaled architectural and engineering drawings. You'll find all the drawing tools you expect, plus advanced capabilities like merging shapes, subtracting one object from another, and even gluing lines and curves together. Fill any shape with one of 16.8 million colors, or create custom patterns. Now you can draw your dreams.

Innovative Data Design
4707 Dreams 1.1 **$319.**

Call 1-800/334-4444 to Order.

Software Product Of The Year. That's the award *MacUser* gave **Freedom of Press** (along with Best Graphics/Publishing Utility) in their 1989 Eddies for "giving the full power of PostScript to a wide variety of output devices" and bringing "high-quality imaging to more users than ever before." It does so by transforming PostScript files into bit-mapped images that can then be output on non-PostScript devices. So if you use programs like *PageMaker*, *Quark Xpress*, or *Illustrator*, you can get PostScript output on many popular laser printers, ink jet printers, dot matrix printers (including all Epson LQs), color thermal printers, and film recorders from Presentation Technologies and Lasergraphics. It comes with 35 outline fonts which you can scale and rotate to custom point sizes and angles. Plus, it supports 24-bit color, so you can get detailed continuous-tone images. Best of all, once you install it, it takes care of itself. Just connect any of the supported output devices to your Mac II, IIx, IIcx, IIci, or SE/30 with at least 2 megabytes of memory, and you'll be able to output any PostScript file. It's a great way to get all the value of your PostScript software without the expense of a PostScript output device. And that's freedom of choice.

Custom Applications ... 30 day MBG
6517 Freedom of Press 2.1A **$259.**



GRAPHICS & DESIGN



EPS Clip-Art For Serious Business. Here are two volumes of clip-art designed specifically for business use. **Cliptures: Business 1** gives you 148 executives, engineers, computers, calculators, business cartoons, planes, trucks, and symbols. **Cliptures: Business 2** adds another 206 EPS clip-art files including people, aircraft, silhouettes, telephones, graphics, and computers. And you can customize and add color with programs like *FreeHand* or *Illustrator*.

Dream Maker ... 30 day MBG

4840 Cliptures: Business 1 **$69.**
4841 Cliptures: Business 2 **69.**



Bitmap Clip-Art For Serious Fun. Whether you're sending holiday greetings to a few thousand of your closest friends, or designing a poster announcing that you're running for office, **MacGallery** has the perfect bitmap graphic. The package comes with over 400 original hand-drawn illustrations covering fantasy, foods, sports, nature, special occasions, holidays, religion, borders, and more than your average number of bears! Feel free to make changes or even add color with your color paint program. Available in either HyperCard stack or MacPaint versions.

Dream Maker ... 30 day MBG

4088 MacGallery *(MacPaint)* **$27.**
4115 MacGallery *(HyperCard)* **27.**



Put Your Charts In The Third Dimension. With **DeltaGraph**, you can prove your words (and numbers) are worth 1,000 pictures. Create riveting charts and graphics with flexibility and precision that will turn your competitors green with envy. Don't like green? DeltaGraph offers a 256-color palette (many other Mac charting programs offer just 8). Choose from 25 chart types, from basic 2D to sophisticated 3D styles. And DeltaGraph lets you rotate your 3D charts to any elevation, perspective, or viewing angle. Bring in data from *Excel* 2.2, .WKS, SYLK, or *CricketGraph* files, and export to PICT, EPSF, or *Adobe Illustrator* format. Every chart element is customizable, and a full set of professional drawing tools lets you add original touches. When you're done, output to any PostScript or QuickDraw device with full 8-bit color support. If you want to make a convincing case, DeltaGraph will put your presentations into another dimension.

DeltaPoint ... 60 day MBG

6095 DeltaGraph 1.0. **$99.**

-800/3

No Hidden Charges.

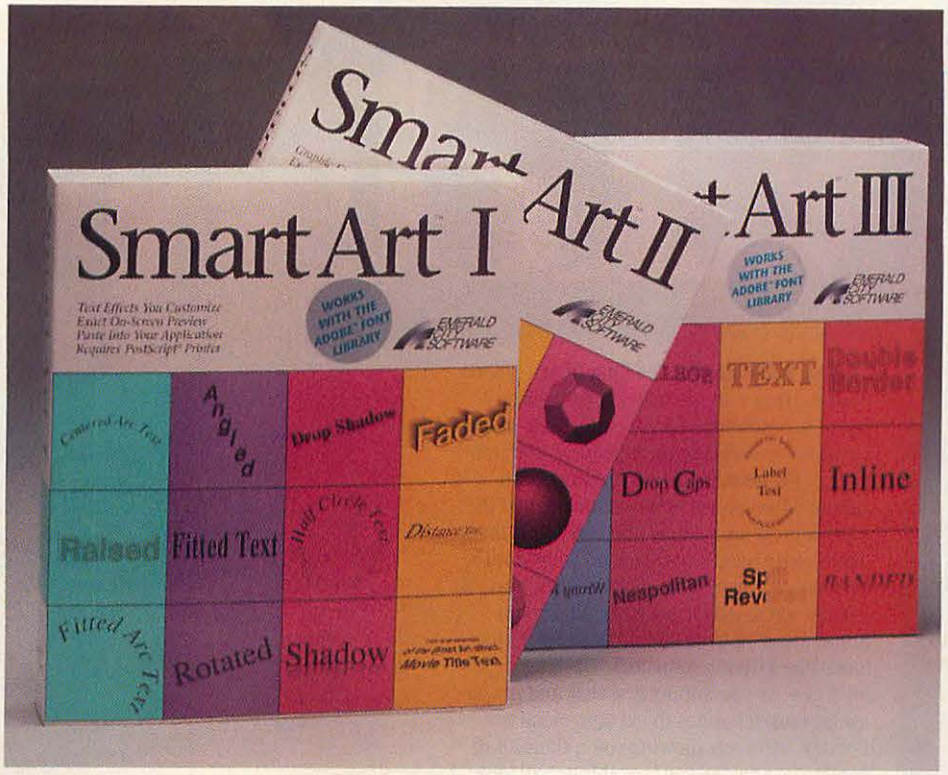


Add Zip To Any Document. The three-volume DA **Smart Art** uses the PostScript in your laser printer to turn your text into 2D and 3D graphics on your Macintosh screen. Each volume contains 15 effects to create images that can be pasted into most drawing, word processing, and desktop publishing applications, and output with any Adobe PostScript printer or other device. Smart Art works with any PostScript font, too.

Just For ATM Owners. Give your type a change of face with **TypeAlign for ATM**. Rotate, wrap, skew, and kern type. Then add special effects like outlines and see it all on screen, instantly. You can print on any ATM-supported printer including ImageWriters, DeskWriters, and LaserWriters. Since TypeAlign for ATM is a desk accessory, it's easy to install and use. It works with all major word processing, desktop publishing, and presentation programs, and any ATM supported font. And it supports over 16 million colors.

Emerald City ... 30 day MBG

6098 Type Align for ATM 1.0 **$60.**
5168 Smart Art I 1.0.1 **84.**
5602 Smart Art II 2.0 **84.**
5603 Smart Art III 2.0 **84.**



Unlimited Toll-Free Technical Support.

Clip-Art Maps. Add a new dimension to your proposals, periodicals, and presentations with **MacAtlas**. You get detailed clip-art maps of the entire world, world regions by country, USA by state, and all 50 states by county. MacAtlas maps are ready to customize with fill patterns, drop shadows, text, and more. Available in Paint, Draw (PICT), and Illustrator/Freehand (EPSF) format. *Macworld* gives it five stars.

MicroMaps ... 30 day MBG

5516 MacAtlas 2.0 *(MacPaint)* **$45.**
5514 MacAtlas EPSF 1.0 *(PostScript)* . **105.**
5513 MacAtlas Professional 1.0 *(PICT)* **105.**



Color Your World With 8-Bit Or 32. Professional color graphics don't get much more colorful than **PixelPaint**. Version 2.0 offers 16 million colors, including Pantone colors, the printing industry standard. Create superb quality artwork for ads, brochures, annual reports, letterheads, and more, with a rich set of drawing tools and 8-bit color. *MacWEEK* (4/89) said PixelPaint was "well worth waiting for." For more power, try **PixelPaint Professional**, winner of an Honorable Mention in the 1989 *MacUser* Eddy Awards. You get up to 32-bit color depth, true anti-aliasing, and more sophisticated image processing. When you're ready for output, either version offers sophisticated undercolor removal and screen angling control. Any image can be printed as a halftone, full-color, 4-color separation, or spot color.

SuperMac Technology ... 60 day MBG

3380 PixelPaint 2.0 **$225.**
5625 PixelPaint Professional 1.0 **389.**



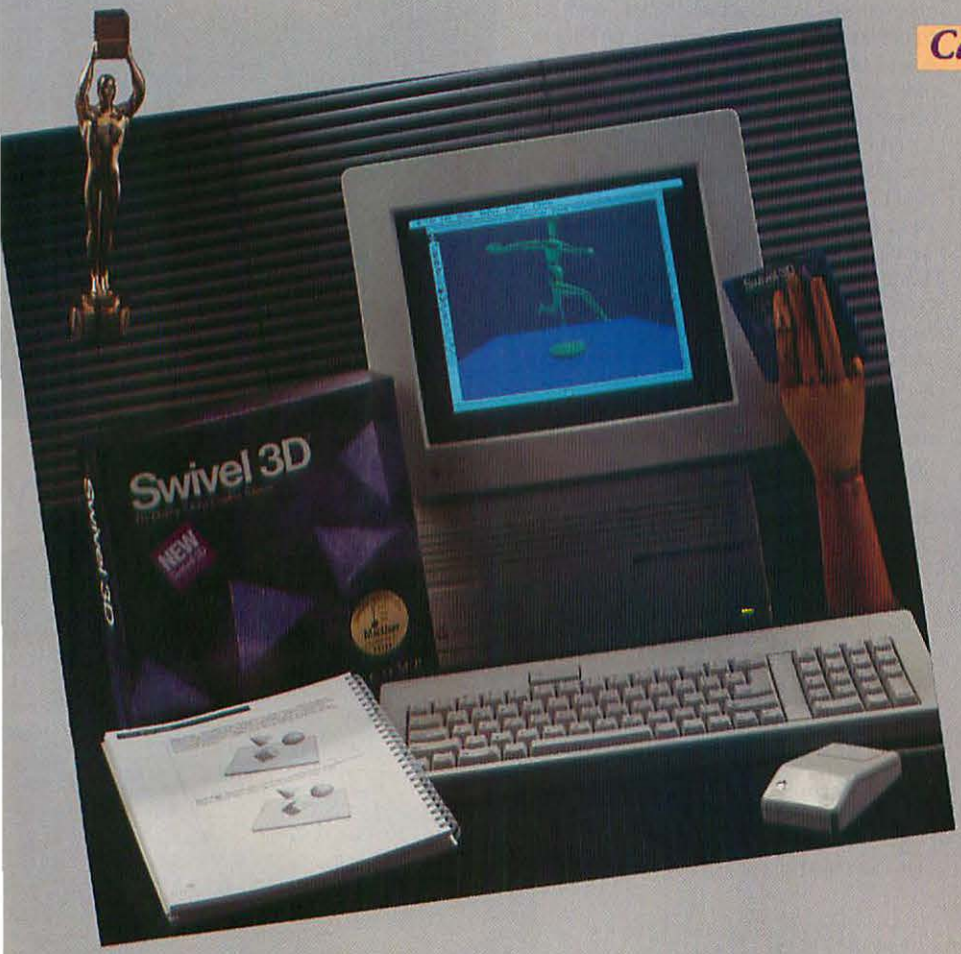
No Sales Tax.

84-44



Desktop Publishing For The Faint Of Art. Silicon Beach, always an innovator in Mac interfaces, has developed an exciting page layout program specifically for beginners and non-artists. **Personal Press** lets you work with simple boxes and graphic elements, just like a Draw program. Simply open one of its many AutoCreate templates, click on your stories, click on your graphics, click Preview, and you can see what your newsletter, ad, promotional piece, or even simple business letter looks like without doing any "designing" at all. Then, as you import new text and graphics, or make changes to existing elements, Preview will keep showing you a thumbnail version so you can see how things will look before you click OK. And, behind all this simplicity you get the power of a full-featured word processor with thesaurus and spell-checker, support for full-color 8-bit PICT, TIFF, EPS, and MacPaint graphics, spot colors, spot color separations, a library of border designs, brightness and contrast control of halftones, and everything else you need for professional-looking desktop publishing.

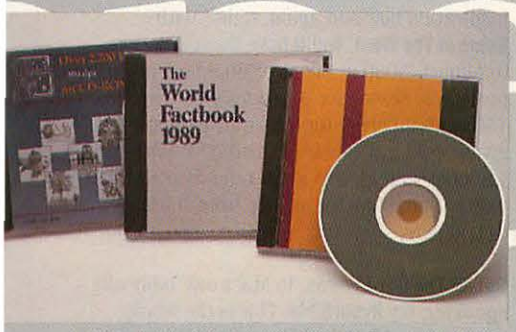
Silicon Beach ... 60 day MBG
6674 Personal Press **$199.**



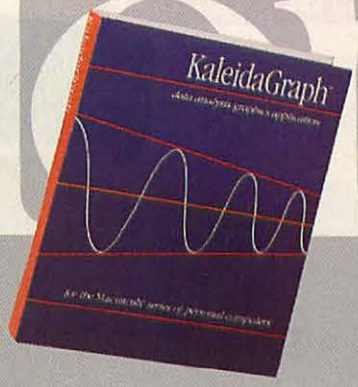
Call 1-800/334-4444 to Order.

Draw On The Power Of Another Dimension. Sometimes two dimensions just aren't enough to hold your ideas. If that's true, then check out **Swivel 3D**, winner of the 1989 Eddy from *MacUser* (3/90) for the Best 3D Graphics Program. It offers sophisticated modeling and drawing abilities for graphic artists, desktop publishers, and business presenters. Powerful linking features let you create models that can twist, turn, swivel, and realistically move in three dimensions. Use it to design anything from a simple knob to a complex joint—and see it move naturally on screen. Import graphics from almost any format, adjust lighting, and add shadows and other special effects. Its incremental animation command (tweening) creates 3D animated presentations with either *Macromind Director* or HyperCard stacks. You also get advanced rendering features and output to PostScript halftones (for color separations), EPS, PICT, and PICT2. Works with all PostScript printers and includes an extensive library of images so you can "swivel" immediately.

Paracomp
4597 Swivel 3D 1.1 **$299.**







Experience Vietnam. Even If You Weren't Born On The 4th. Look back at history with **Vietnam Remembered**, which brings all the facts, figures, and color images of this significant event to life on CD-ROM. It includes the moving Vietnam Memorial database, battle sequences, histories, and much more. Or understand the world with **The World Factbook**, a comprehensive CD-ROM database of over 250 countries and territories. Engrossing for browsing, plus great detail for professionals. **Quick Art** provides 2,200 quality TIFF images (300 dpi) for use in any type of presentation or document. Quick, easy, efficient, and high caliber.

Wayzata Tech. ... 60 day MBG
6576 Vietnam Remembered *(CD-ROM)* **$69.**
6369 The World Factbook 1989 *(CD-ROM)* **69.**
6370 Quick Art *(CD-ROM)* **175.**

Publishing Pizazz At A Paltry Price. Get desktop publishing power without spending lots of money or time. **Springboard Publisher II** turns ordinary documents into persuasive pages in just a couple of clicks. Add and edit graphics (including EPS, PICT or Paint art), reformat page layouts, add special effects, and use powerful typographic tools. Its SmartArt DA gives you six exciting PostScript special effects for text. Plus, you get plenty of word processing power and graphic tools. Comes with a coupon for 500 pieces of clip-art or 36 newsletter templates free!

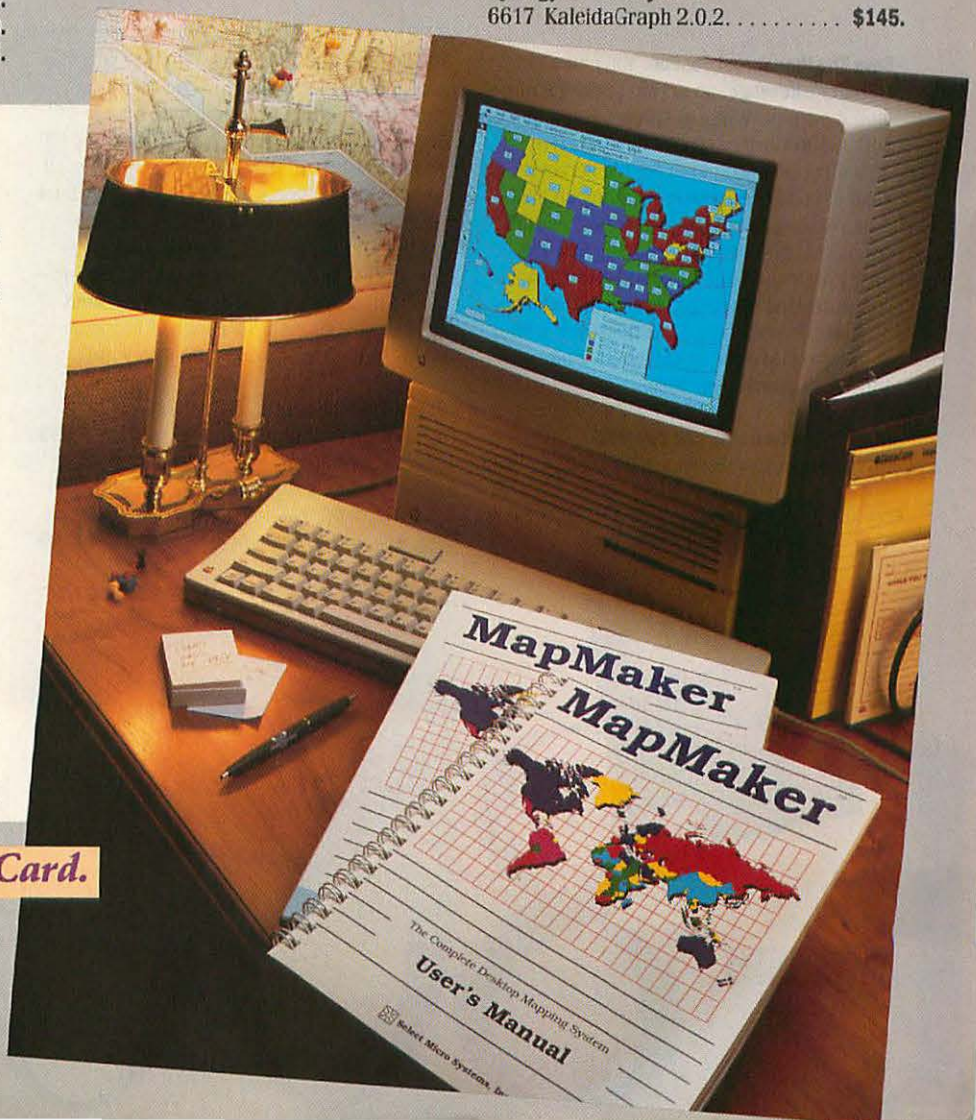
Springboard ... 30 day MBG
4500 Springboard Publisher II 2.0. . . **$109.**

Graphic Analysis. Even a Vulcan would be proud to own a data analysis and presentation tool like **KaleidaGraph**. Enter or import data, run sophisticated analysis, and then create scientific or business graphics at lightning speeds. It includes 14 plot types, user-defined macros, and a programmable RPN calculator with a full library of arithmetic and transcendental functions. You can also use any graph as a template for plotting future data sets and fit data with your own user-defined function via the general curve fit option.

Synergy ... 30 day MBG
6617 KaleidaGraph 2.0.2. **$145.**

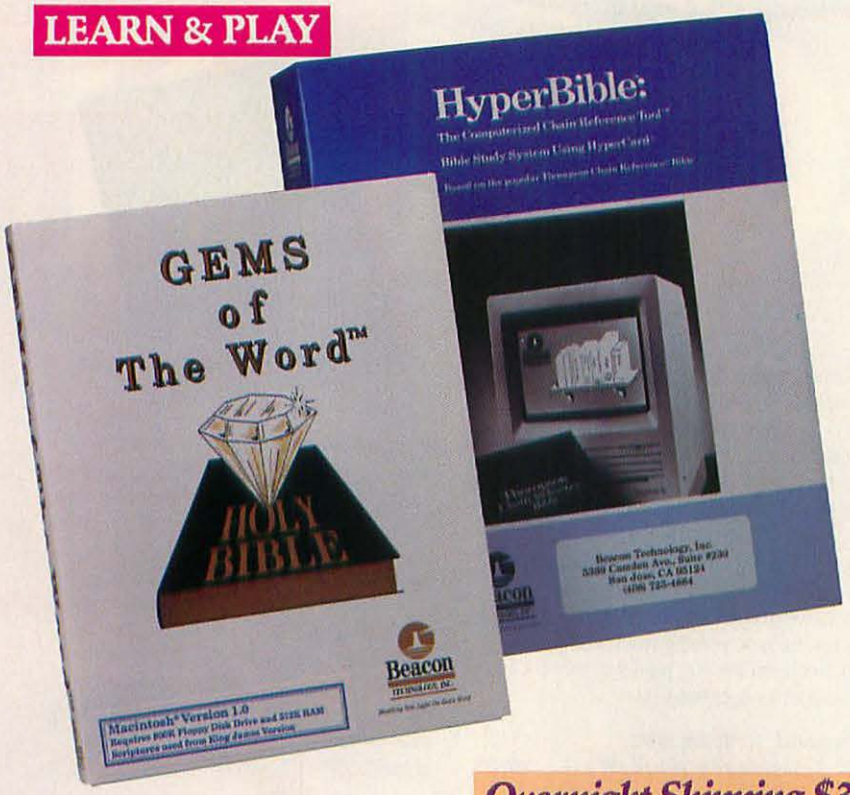
Put Yourself On The Map. Or put your customers, demographic data, or anything else on the map, for that matter, with **ATLAS-MapMaker**, an incredibly powerful mapping tool for the Mac. It easily produces full-color, publication quality maps of the U.S. by counties and states, as well as 176 countries around the world. Features such as built-in drawing tools, interactive zooming, on-screen distance measurements, graphics tablet support, and more, make it simple to customize your map precisely to your liking. ATLAS-MapMaker also provides a powerful data analysis framework. Up to 30 data variables for each area of the map may be entered into the database, or imported from other applications, such as an *Excel* spreadsheet or an *Exstatix* statistical data file. Using ATLAS-MapMaker, it's easy to quickly uncover hidden relationships in geographic data and then demonstrate these findings with striking presentation graphics. And, it received a 5 Mice rating from *MacUser* (1/90).

Strategic Mapping ... 30 day MBG
6518 ATLAS-MapMaker 4.0. **$289.**



No Surcharge on Credit Card.

LEARN & PLAY



Get The Good Word. Everybody needs a little inspiration now and again, right? With **Gems of The Word**, you'll have instant access to almost 2,000 of the most popular Biblical passages. Search for passages linked to over 150 contemporary topics, or have the program provide a "verse of the day" each time you boot your Mac. A great reference and inspirational tool for anyone from students to teachers.

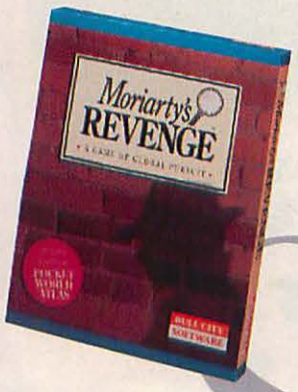
Get All The Good Words. To Macs out, biblically speaking, try **HyperBible**. This is the whole enchilada—*15 Meg* of HyperCard Bible, in either King James or New International Versions. Based on the *Thompson Chain-Reference Bible*, a comprehensive indexing of every single Bible verse with thousands of cross-references, it will enable you to find anything about anything in the Bible, fast. Also includes maps of Biblical sites, recorded name pronunciation, journey maps, archaic terms glossary (KJV only), and much more. If the Bible's part of your life, it'll sure help to make HyperBible part of your Mac.

Beacon Technology ... 30 day MBG
6426 Gems of The Word 1.0 **$25.**
4967 HyperBible 1.0 *(King James)*. . . . **145.**
4968 HyperBible 1.0 *(New Int'l.)* **175.**

Overnight Shipping $3.

Save The World. Just For Fun. You can with **Moriarty's Revenge**, an action-packed game of global pursuit. While in London you'll join up with an obscure international detective organization and search for ten secret criminal societies who are ruining civilization. (No kidding.) This game requires skill, wit, nerve, and two picture IDs. (Just kidding.) With vivid digital sound effects, a computerized notebook, over 1,000 clues, and plenty of diabolical witnesses. It's your chance to make the world a better place. Unless, of course, you lose...

Bull City Software ... 30 day MBG
5841 Moriarty's Revenge *(CP)* **$32.**



The Sounds. And The Music. Whether you're a non-musician or a pro, you can turn your Mac into a recording studio with **Super Studio Session**. You get 8-track recording, 93 distinct voices, and amazing control over all composition aspects. And, you can play back your masterpiece right on your Mac—no synthesizer needed. The **Bundle Pack** gives you all the sounds to go with all that music—over 320 different instruments and sound effects, covering a wide range of musical styles. What more could a po' boy want?

Bogas Productions ... 60 day MBG
4255 Super Studio Session 2.0 **$65.**
6135 Super Studio Session Bundle Pack *(includes Brass, Country, String Quartet, Heavy Metal Rock, and Sound Effects disks)*. **99.**



Take The Mystery Out Of Math. With **Math Blaster Mystery**, your kids get the clues they need to solve the secrets of math, with an interface that's so friendly they'll be inspired to get really involved. Math Blaster Mystery was designed by teachers, is classroom tested, and will help students in grades 5-12 learn about positive and negative numbers, fractions, decimals, pre-algebra, and more. Includes a pop-up calculator and a *Search for the Clues* game to develop logical thinking and problem-solving skills.

Davidson & Associates
6128 Math Blaster Mystery *(CP)* **$26.**



1-800/3



Learn To Read And Write Music. Develop your ear for intervals, chords, melody, and rhythm, and have fun doing it with **Practica Musica**. Just point and click on the screen, keyboard, or use a MIDI instrument. Called "a sensational learning program" (*MacUser* 11/87) and one of the "best 200 Mac products of 1989" (*MacUser* 12/89), it features high-quality sound, interactive notation, and a coordinated textbook. For both beginners and advanced students. Version 2.2 includes a new chord ear-training section.

Ars Nova ... 30 day MBG
1215 Practica Musica 2.2 **$69.**



Rule Famous Cities. Or Build Your Own. If you're hungry for power or fun, you'll love **SimCity**. This incredible city simulator won a 1989 Eddy for Best Recreation Program from *MacUser*. You can take charge of seven world famous cities, and build housing and highways, deal with crime and pollution, and a lot more. The simulator will constantly try to thwart you with disasters. Will your city prosper, or turn into a hell realm? It's up to you. Use the **SimCity Terrain Editor** to create your own custom city. Original (b&w) version for any Mac except the IIci. **SimCity Supreme** is a 16-color version (includes SimCity Terrain Editor) for *any* Mac II or SE/30 (with an external monitor).

Broderbund Software
4966 SimCity 1.1 **$29.**
5871 SimCity Supreme **48.**
6515 SimCity Terrain Editor **16.**

No Credit Card Charge Til We Ship.

Call MacConnection to Order.

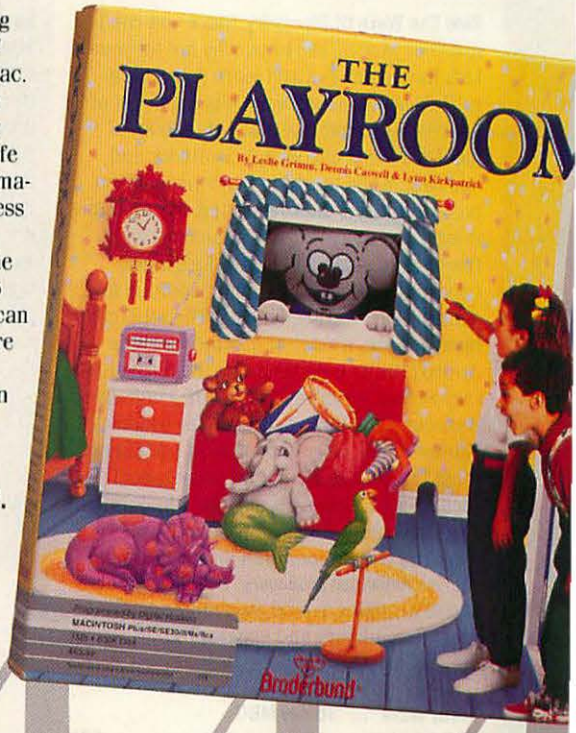
Communicate With Aliens. And do lots of other strange things in **Starflight**, one of the most ambitious space fantasy games ever. Your mission is to seek out new life and remnants of ancient civilizations with your hand-picked crew of six (you can choose from five different races, including reptiles and insects). Over 270 star systems, 800 planets, and seven alien races to explore. Exquisite animated graphics, color contour maps (and support of monochrome), and much more make it a must for sci-fi enthusiasts.

Electronic Arts ... 30 day MBG
6594 Starflight **$39.**

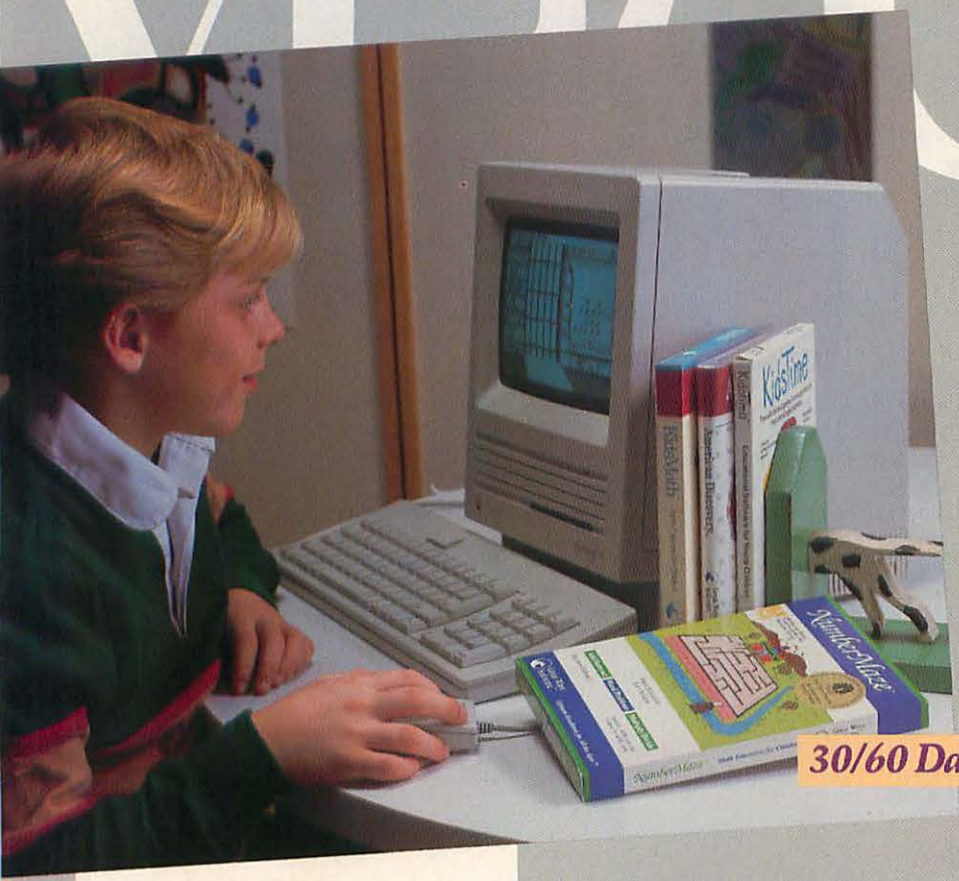


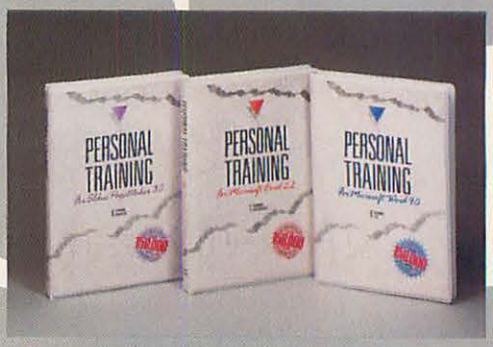
Hands-On Learning For Kids. Buy your young students **The Playroom**, a colorful world of excitement and discovery right on your Mac. It's so much fun that your child will never suspect it's educational. Just click on any toy in The Playroom, and it will come to life with high-quality digitized sound and animation. There are reading- and math-readiness activities, creativity exercises, and some purely fun games. Multiple levels make the games suitable for kids from preschool to early elementary. Even younger children can work it without your help, though there are plenty of activities to explore together. Includes a stuffed version of the on-screen mascot, Pepper Mouse.

Broderbund Software
6516 The Playroom *(CP)* **$27.**



800-344-4444





Become A Power User. Listen and learn software at your own pace on your own Mac by listening to an expert talk you through a program, step by step, while you try each new skill. Each 90-minute tutorial includes an audio cassette, example files on disk, and quick reference card.

Personal Training Systems ... 60 day MBG
(Note: Each series is available in beginning, intermediate, and advanced levels; see our complete product list for details.)
Personal Training for: Excel 2.2, Word 4.0, Persuasion 2.0, HyperCard, PageMaker 3.0, Works 2.0, Illustrator 88, FileMaker II, Freehand 2.0, and the Macintosh. **each $36.**

30/60 Day Money-Back Guarantee.

Ride The Wave Of Discovery. Since you can't use your Mac *all* the time, why not let your kids have some fun and learn something, too? Great Wave Software has a quartet of educational products that kids will love. **KidsTime** helps encourage creativity and learning, while teaching letter recognition, basic keyboard skills, counting, the alphabet, music, and more. **KidsMath** includes eight fun-to-play games that introduce math concepts such as place value, addition and subtraction, and sequencing. Then there's **NumberMaze**, winner of a *MacUser* Eddy Award (1989) and called the "Best Elementary School Program" (*Software Publishers Association*, 1989). Designed for grades K-6, NumberMaze offers 36 levels of play, keeps stats for each student, and automatically identifies (and focuses on) individual difficulties. It includes animation, sound, and graphics to help maintain interest. Finally, there's **American Discovery**, which uses interactive graphics, sound, and animation to teach U.S. history and geography.

Great Wave ... 30 day MBG

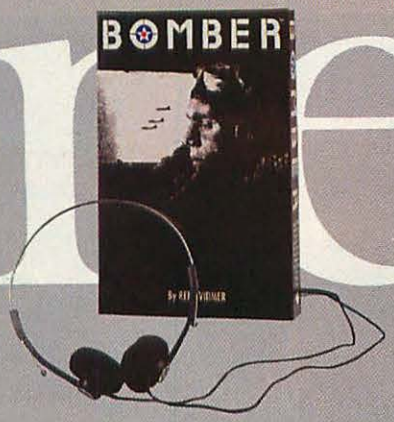
2276	KidsTime 1.2 *(ages 3-8)*	**$26.**
5642	KidsMath 1.1 *(ages 3-8)*	**26.**
4334	NumberMaze 1.1 *(ages 5-12)*	**26.**
2270	American Discovery 2.3 *(ages 9+)*.	**26.**

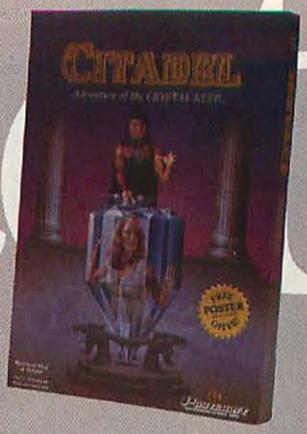
Savoir-Faire With A Brand New Flair. Let your Mac help *expand your knowledge* of a foreign language. **VocabuLearn/ce** is a synthesis of the best selling "audio flashcard" vocabulary program and a powerful HyperCard stack. With three hours of Dolby sound, digitally mastered on two audio cassettes, it lets you listen to crisp pronunciation of native speakers, with or without your Mac! Words and expressions jump to life to greatly increase comprehension. Use the HyperCard *interactive options* to display words in a sequential, random, or reverse order; reveal, hide, or delay answers; reverse translations; and add/modify word lists. *Go ahead, test yourself! C'est magnifique!*

Penton Overseas ... 30 day MBG

Level I	Level II			
5864	5887	French 1.06 . . .	**ea.**	**$29.**
5865	5889	Italian 1.06 . . .	**ea.**	**29.**
5867	5891	Spanish 1.06 . .	**ea.**	**29.**
5868	5888	German 1.06 . .	**ea.**	**29.**
6639	6640	Russian 1.1 . . .	**ea.**	**29.**
6638	NA	Hebrew 1.1 . . .	**ea.**	**29.**
5866	5890	Japanese 1.06 .	**ea.**	**35.**









Bombs Away. Looking for some super-realistic WWII action adventure? **Bomber** offers twenty-five different missions that put you in control of a B-17 in the skies over Nazi Germany. Intense is the operative word here. Make the right split-second decision and you get to fly another mission. You have your own ten-man crew and high-quality digitized sound and animation. Works with a Mac Plus on up, but optimized for the Mac II series. HyperCard required.

Inline Design ... 30 day MBG
5870 Bomber *(includes headphones)* . . **$26.**

Forget Winning. Think About Survival. Throw out all the rules when you enter the depths of the **Citadel**, a fantasy role-playing challenge from Postcraft International. Your quest is to free the Lady Synd, who has been cruelly imprisoned by the evil Wizard. But you'll need all you've got (and more) simply to survive this one. Create your own heroes with unique characteristics, engage in real-time combat, and deal with might, magic, and mystery. Knockout sound and graphics.

Postcraft International Inc.
6466 Citadel **$27.**

Learn To Order Sushi On Your Mac. With **Kanji Master**, your Mac can speak over 325 Kanji characters and hundreds of compound words, all with high-quality digitized sound recorded by a native Japanese speaker. It's a great way to practice pronunciation, writing, and English meanings. To learn Russian, Spanish, French, or German, try **Word Torture**. There's no aural gratification, but each program has automated vocabulary drills and more for over 1400 words. Also ask about HyperGlot's *Verb Tutor* series: audio-based programs for the same four languages. HyperCard required for all.

HyperGlot ... 30 day MBG
6611 Kanji Master *(Japanese)* **$105.**
6603 Word Torture *(Russian)* **29.**
6605 Word Torture *(Spanish)* **29.**
6607 Word Torture *(French)* **29.**
6609 Word Torture *(German)* **29.**

Call 1-800/334-4444 to Order.

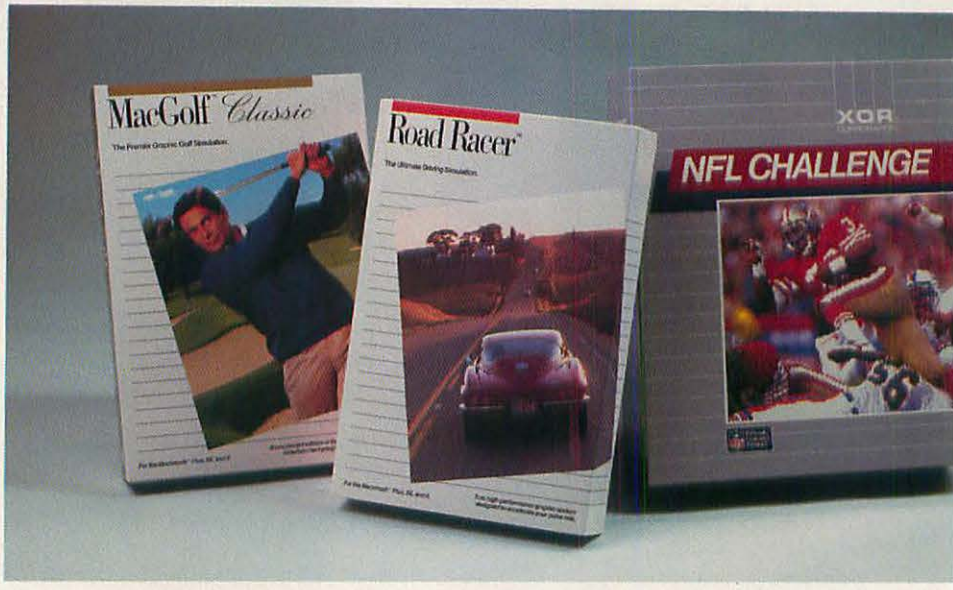
Too Much Stress????!!!! Time For A Game. But don't think of them as mere games. Think of them as sensible recreational therapy for the overworked business person. And, remember: as long as you're at your Mac, everyone thinks you're working. SoftStream gives you a great selection of games, most of which you probably played as a kid. **Mac•Man** pits the Mac against nasty little PCs in the familiar arcade-like game. You get 16 different mazes, and a Mini Stick joystick is included (or you can use the keyboard). **Colour Billiards** includes seven different pool/billiard games with realistic action and sounds in a full-color setting. (*Billiard Parlour*, a monochrome product for the 512, Plus and SE is also included.) If you're a card player there's **Cribbage Tutor**, with three different skill levels and the ability to teach as it plays; **22nd Street Whist Tutor**, a straightforward but challenging variety of Whist for both novices and experts; **Solitaire DA**, with three different Solitaire variations on a desk accessory (so you can take a break anytime); and **MacRummy**, which includes both straight Rummy and Gin Rummy. Whatever your game, SoftStream is ready when you are.

SoftStream Int'l., Inc. ... 30 day MBG
4071 Mac•Man **$23.**
4073 Colour Billiards **38.**
4995 Cribbage Tutor **26.**
6259 22nd Street Whist Tutor **32.**
4072 The Solitaire DA **23.**
6258 MacRummy **32.**



LEARN & PLAY





Nasty. Screaming. Dirty. Swinging. Fun. There are many faces to fun, and XOR has plenty of them. **TaskMaker** challenges you to help a world that's mired in depression and devastation (feel at home?). Restore order and prosperity...find the TaskMaker and complete the ten tasks he assigns. But watch out! There are some real offensive monsters in the way including skeletons, zombies, and giant caterpillars.

Race. Ace. Score. How about racing your '65 Vette at speeds up to 200 mph with **Road Racer**? Five racing environments with three levels of difficulty each. Digitized sound and graphics so real you'll feel the wind in your hair. Every day is Sunday with **MacGolf Classic**. Truly awesome graphics and sound on 108 holes of championship play. Realistic ball movement and action, with the full 14 clubs available. **NFL Challenge** offers super-realistic football excitement, using all 28 NFL teams. Includes individual player attributes, random events, and animated play action with slow-mo instant replay.

XOR ... 30 day MBG

6152	TaskMaker *(CP)*	**$27.**
4517	Road Racer *(CP)*	**38.**
4320	MacGolf Classic *(CP)*	**53.**
3815	NFL Challenge 1.2 *(CP)*	**57.**

No Sales Tax.

Entertainment Groupware For You. Try the software that transforms your computer network into an action-packed battle zone. **Strategic Conquest** is the warfare simulator that dares you to explore and conquer one of over two billion different worlds. Or, to battle beyond the limits of your planet, launch **NetTrek** and attempt galactic colonization in the real-time space battle simulator. Both allow you to challenge other network users or your Mac. Hours of full-color, networkable entertainment.

Premier Technology

5773	Strategic Conquest Plus 2.0	**$34.**
5774	NetTrek—The Real Version 2.3	**34.**

Future Shock. Alien "Orbs," sadistic humor, and lurid horror. Yup, it's just another day on the job in 2004, when you check out **Manhunter: San Francisco** or **Manhunter: New York**. Some disgusting aliens and their all-seeing orbs have conquered San Francisco and New York, and now you are forced to work undercover for the aliens, turning in fellow humans. You get to deal with all kinds of mutants and renegade Ninjas. Both games feature great grizzly graphics, super scenery of famous landmarks, and a non-typing interface.

Sierra On-Line

5694	Manhunter: San Francisco *(CP)*	**$29.**
5458	Manhunter: New York *(CP)*	**29.**

Give Pieces A Chance. Challenge the Russians on the friendliest of terms with these addictive games from the brilliant Soviet programmer Alexey Pajitnov. In the classic **Tetris**, as pieces descend from the top of the screen, you have to flip and move them to fit precisely with each other to form complete horizontal rows. Easier said than done! Quick-thinking is required, with 10 skill levels. **Welltris** puts you into another dimension: a 3D well where you try to accurately position pieces around the four walls. About the most fun you can have this side of Glasnost.

Spectrum HoloByte ... 30 day MBG

3464	Tetris	**$20.**
6112	Welltris	**20.**



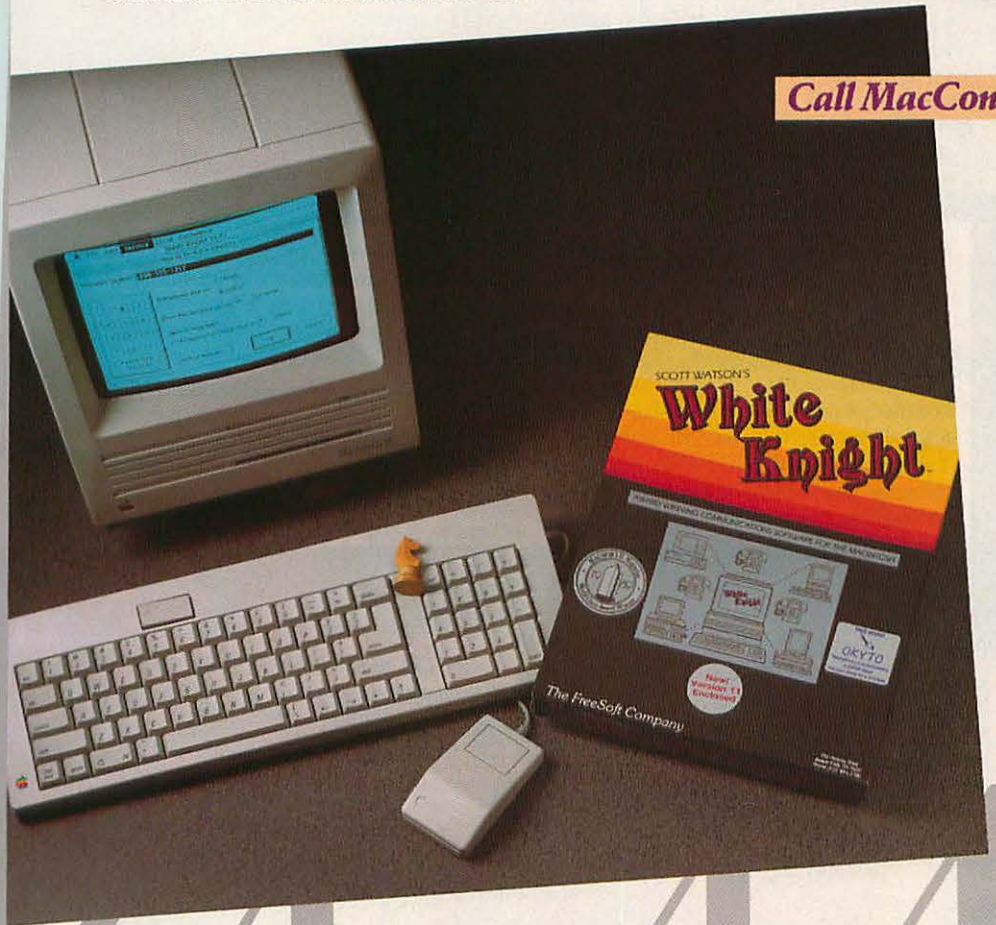






"The Dominant File-Translation Program." That's what *MacUser* said in awarding **MacLinkPlus/PC** a 1989 Eddy for Best Connectivity/Networking Hardware. This package proves it's not just *how* you're connected, it's *how well* you're connected. You get software, a direct-connect cable (or use your modem), and over 100 translators. Which means you can move files *with all formatting intact* between, for example, your Mac's *Word* and *WordPerfect* on the PC, or your PC's *1-2-3* and *Excel* on the Mac. In fact, it's safe to say that you can translate any popular Mac application file into any popular PC application file (and vice versa); formulas, formats, and all. Just click between two familiar Mac file windows. Use MacLink Plus/PC to move files between just two machines or between Mac and DOS machines on a network (in which case you can simply buy the Translators alone without cables or connectivity software). Incompatibility is simply no longer a problem when you're Maclinked.

DataViz ... 60 day MBG
1823 MacLinkPlus/PC 4.12
(includes Translators) **$119.**
4842 MacLinkPlus/Translators 4.12 . . . **99.**



Call MacConnection to Order.

Communication Savior. The successor to the legendary Red Ryder telecommunications program, **White Knight 11** will champion the cause of anyone who wants powerful communications. New features include support for file transfer protocols like ZMODEM, three styles of YMODEM, Flash, and three styles of Kermit. Terminal emulation has been enhanced to support DEC VT102, as well as 32-bit color QuickDraw, and large monitors. Transfer throughput has been noticeably increased, and White Knight 11 will work transparently in the background under MultiFinder. You can even customize the interface with your own icons and pictures, and the souped-up Host Mode allows for unattended remote operation. Plus, the almost 300-page manual includes a spiffy tutorial. White Knight 11 is one telecommunications program that really saves the day.

Freesoft ... 60 day MBG
6115 White Knight 11 **$85.**

34-4444

NETWORKS & COMMUNICATIONS





Take Two To Go. Or To Stay. How do you share knowledge and information with someone—even when you can't be there? The **Timbuktu** family of screen-sharing and file-transfer software, that's how. Working together has never been easier, whether you're down the hall or as far away as Timbuktu. When you're on the road, use the **Portable Pack** to make sure you don't miss that connection.

It's got everything you need to connect your Mac Portable to another Mac (except a modem): two copies each of **Timbuktu** and **Timbuktu/Remote** software, plus tools for connecting to any telephone system. Also included is everything you need to hook up to a LAN at a customer site—right down to the *StarConnector*. Need a modem, too? Then get the **Timbuktu/Remote Access Pack**, which includes Farallon's *Remote/V.32* modem.

Farallon Computing ... 30 day MBG

5707	Timbuktu 3.0	**$95.**
4866	Timbuktu/Remote	**125.**
5893	Portable Pack *(incl. two copies each of Timbuktu & Timbuktu/Remote, two StarConnectors, and accessories)*	**329.**
6371	Timbuktu/Remote Access Pack	**849.**

No Hidden Charges.



Have Phone? Will Network. Connect your Macs (or any AppleTalk-compatible device) over ordinary phone lines. It's no joke; it's the **PhoneNET** system. PhoneNET connectors conform to LocalTalk standards, using ordinary telephone lines that are already installed in most buildings. For larger installations, a *PhoneNET StarController* (and included *StarCommand* software) provides 12 ports and supports up to 12 physical networks—each with up to 3,000 feet of cable. For greater distances, use *PhoneNET Repeaters*; *CheckNET* software monitors your connections. For network-intensive uses, add *PhoneNET StarController EN* to your LocalTalk network—it gives you the extra speed of Ethernet over the same ordinary telephone wires.

Farallon Computing ... 30 day MBG

2202	PhoneNET to LocalTalk Adapter	**$8.**
5664	PhoneNET StarConnector	**20.**
6273	PhoneNET StarConnector 10-Pack	**139.**
2204	PhoneNET Plus *(DB-9)*	**32.**
2203	PhoneNET PLUS *(DIN-8)*	**32.**
4869	PhoneNET Connector 10-Pack	**198.**
5251	PhoneNET CheckNET	**64.**
4868	PhoneNET Repeater	**315.**
2206	PhoneNET StarController	**825.**
6687	PhoneNET StarController EN	**1599.**



Value-Packed Communications. When it's time to communicate, you don't want to waste time assembling the right stuff: a good modem, reliable software, and the right cable. With the **Mac Communications Pack**, you don't have to worry about a thing. Because it's all in the bag (or the box). The modem is Practical Peripherals' USA-made *PM 2400SA*, in the distinctive Mac platinum color. This high-speed (2400 baud) external modem is 100% Hayes compatible, and is packed with features like full- or half-duplex operation, non-volatile RAM to store the configuration profile, auto-answer mode, and voice or data call operation. Plus, it's backed by an incredible five-year repair or replacement guarantee. Round out your communications needs with the popular *Microphone 1.5* communications software, and a cable to connect to your Mac. It's all you'll need to get on line—and stay there.

Practical Peripherals ... 30 day MBG
3089 Mac Communications Pack 1.5. **$225.**



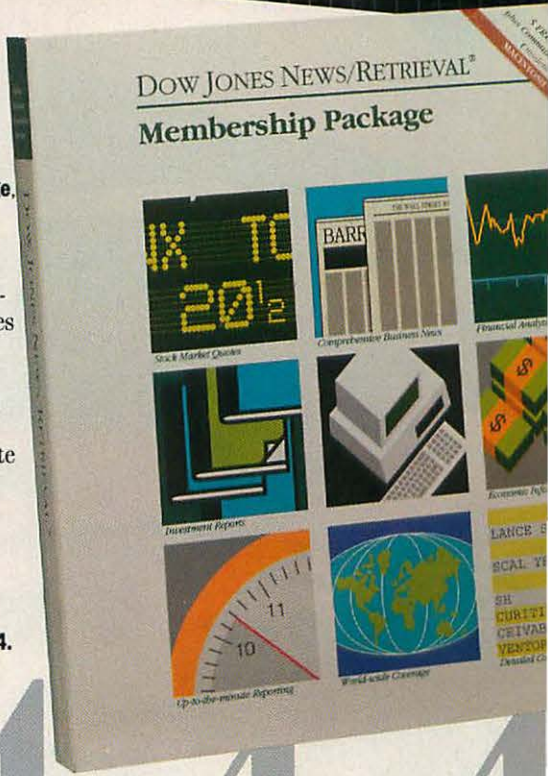
30/60 Day Money-Back Guarantee.

Record And Conquer. Sometimes the best way to make a point is to show *and* tell. **MediaTracks** lets you record the action on your Macintosh screen and play it back—just like a video tape. Then add audio punch to your tape by recording sound with the **MacRecorder** digitizer, included with **MediaTracks Multimedia Pack**. You can then synchronize the screen recordings with the soundtrack you record for multimedia demos. Just plug the palm-sized MacRecorder into the back of your Mac and use any of the three provided software packages to record some sounds. *HyperSound* and *HyperSound Toolkit* let you easily record and save sound directly into a HyperCard stack. You can edit your work on screen with *SoundEdit*, and use the compression feature to create narrated stacks small enough to fit on a floppy (think of the possibilities!). Start adding some serious sound to your work.

Farallon Computing ... 30 day MBG
2199 MacRecorder Sound System . . . **$159.**
6770 MacRecorder Digitizer **89.**
6766 MediaTracks. **189.**
6768 MediaTracks Multimedia Pack . . **319.**
6767 MediaTracks Multimedia Pack *(CD-ROM Version)*. **319.**

Keep Up With The (Dow) Joneses. With the **Dow Jones News/Retrieval Membership Package**, you can keep up with anyone listed on the Big Board—and plenty of companies that aren't. You'll get up-to-the-second news, stock quotes, financial analysis, and historical information for companies and industries around the world. Even with the power of over 50 Dow Jones services at your fingertips, you don't need to be a financial wizard to use DJN/R. Membership includes *E-Z Online* communications software, a complete User's Guide, a one-year subscription to *Dowline* magazine, and five hours of free connect time. Now you can consult the Dow anytime.

Dow Jones ... 30 day MBG
5295 News/Retrieval Membership Pkg. **$24.**



Call MacConnection 1-800/334-4444 to Order.



CUSTOMIZE YOUR COMMUNICATIONS WITH EASE.

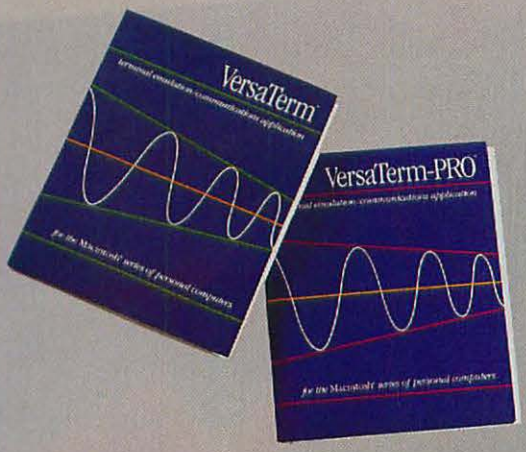
Telecommuting? Improve Your Response Time.

Looking for communications software that's absurdly easy to use and powerful enough to communicate anywhere, anyhow? Well, anyone could phone home with **Microphone II 3.0**—if ET had had it, the movie would have been half an hour shorter. But don't just take our word for it. Computer columnist John Dvorak said that Microphone II 3.0 "does everything except slice bread." And that from a guy who is notoriously difficult to impress. It gives you all the tools to create your own communications interfaces, including color icons, dialog boxes, scroll boxes, and superior text editing. You can then replace any unfriendly interface of any remote service with your own customized front end. Pre-programmed scripts are included so you can simply click on an icon to connect with CompuServe, Dow Jones, MCI, and other leading on-line services. Log-on once and the program stores your password and other data for future use. You can send and receive virtually any type of file including text, graphics, and applications. Version 3.0 of this best-selling program adds the powerful ZMODEM protocol and more sophisticated scripting power including arrays and file variables. If you've avoided getting into communications for your Mac, your last excuse just ran out.

Software Ventures ... 30 day MBG

3455 Microphone II 3.0 **$215.**

Call 1-800/336-4644 to Order



Talk To The Big Boys. When you need a mainframe connection, there's **VersaTerm** or **VersaTerm PRO** from Synergy. Both communications programs provide access to text and graphics data from mainframe apps, with all the convenience of the Mac's mouse and pull-down menu system. There's VT100, VT220, DG D200, and Tektronix 4014 graphics terminal emulation, a wide range of transfer protocols, and the ability to save graphics as MacPaint bitmaps. The PRO version adds enhanced 4014 and 4105 color emulation, and more sophisticated support and control for mainframe graphics.

Synergy ... 30 day MBG
6618 VersaTerm 4.1.1 **$88.**
6619 VersaTerm PRO 3.1.1 **174.**

PC To Mac. And Back. Transferring files from a PC to a Mac (and vice versa) hasn't always been easy, but with the **LapLink Mac III Connectivity Pac**, it becomes second nature. You get everything you need for high-speed serial transfer between the two worlds: 3½" Mac program disk, 6-foot universal connecting cable, and 3½" and 5¼" IBM-compatible disks. Data speeds from one format to another at more than 115,000 bits per second—more than twice the transfer speed of the earlier version. Plus, Version III now supports Mac-to-Mac connections, and uses the new LapLink Mac Accelerator, which boosts Mac-to-Mac transfer by over 500%, up to 750,000 bps. It even has mouse support for the PC!

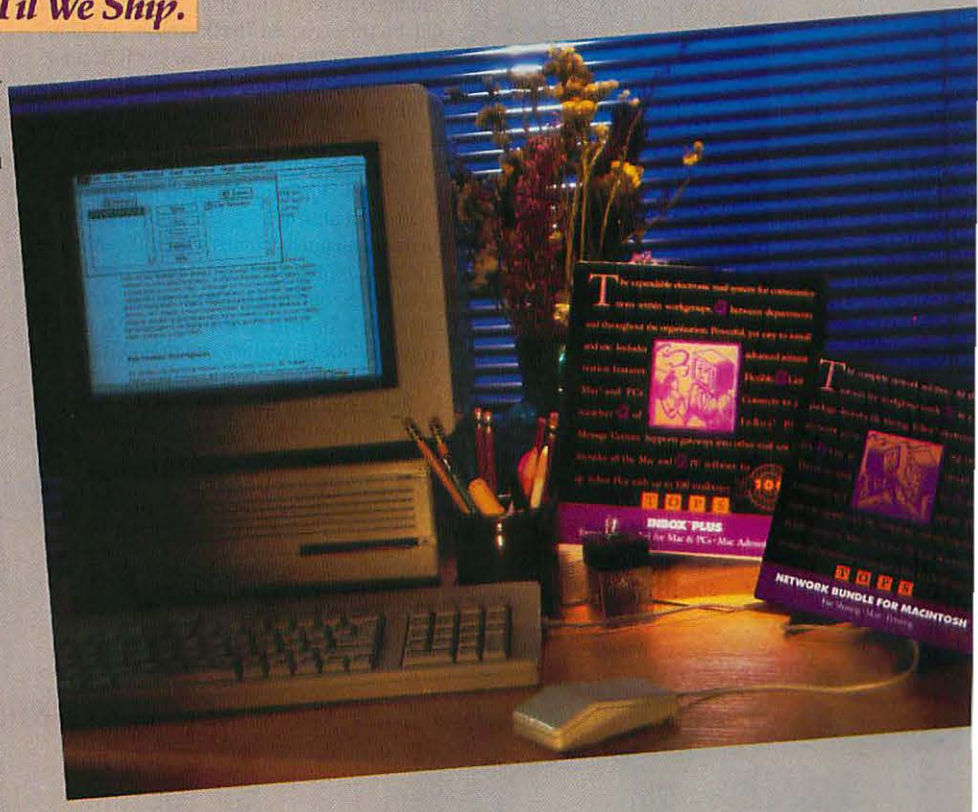


Traveling Software ... 60 day MBG
3729 LapLink Mac III Connectivity Pac **$119.**

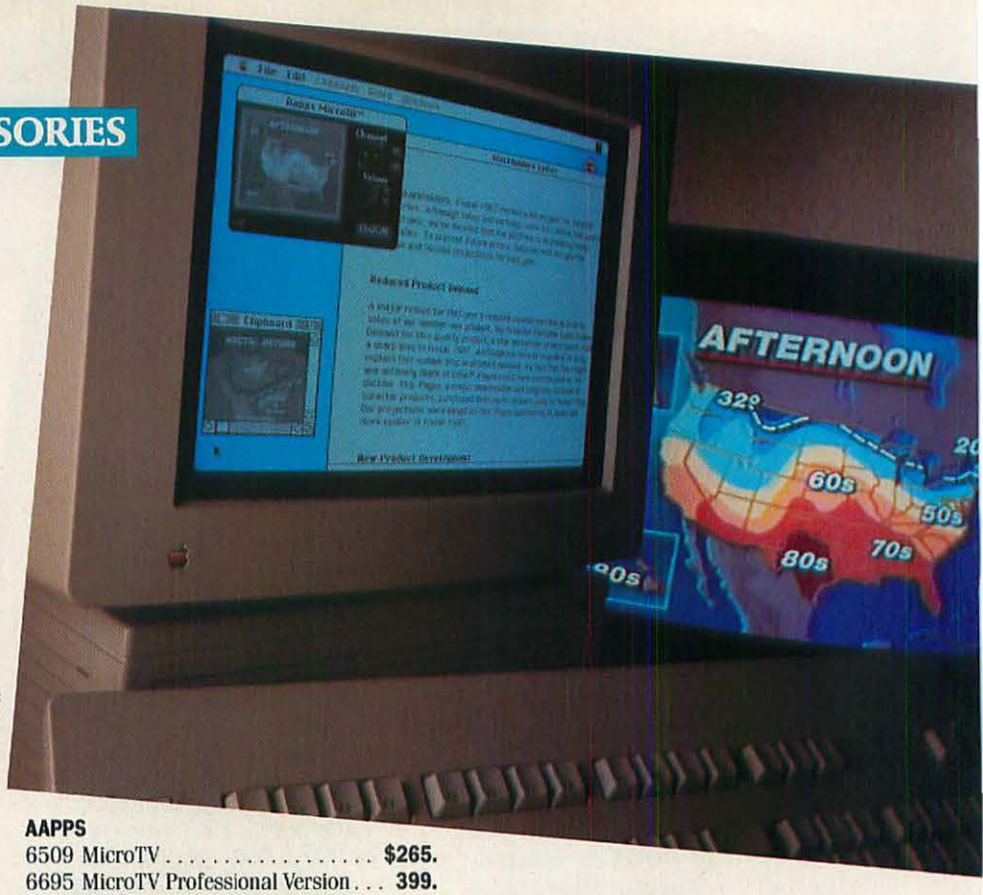
No Credit Card Charge Til We Ship.

Get Your Station On The Network. Hey, networking doesn't get much easier than this. With **TOPS Mac**, any Mac with at least 512K of memory can become a TOPS Network station in about three minutes (no kidding), sharing files, printers, and multi-user applications (fully AFP compliant) over your TOPS network. You can even share stuff with Sun Workstations or IBM PCs (if you want to). TOPS Mac comes with a utility called TOPS Translators (a $159 value) that converts up to 60 DOS/Mac file formats to make the job easier. And the whole thing runs from a single, familiar desk accessory. Plus, it includes TOPS Spool, which turns your PostScript print jobs into background tasks so you can keep working. To transform your pedestrian inter- or intra-office mail into an electronic marvel, use **TOPS InBOX** (also included, or you can buy it separately). Just a few clicks and you'll be sending memos anywhere on the network—and receiving messages even if your Mac is turned off.

TOPS ... 30 day MBG
6264 TOPS Networking Bundle 3.0 . . **$189.**
6377 InBox Mac Administrator *(20 user)* . **215.**
6376 InBox Plus Administrator *(100 user)* **649.**



Real-Time TV And Video For The Mac II. With **MicroTV** and the new **Professional Version** you can tune in to anything from an NBA playoff game to a training film right on your Mac. These NuBus cards digitize video input in real time. Just connect a TV, VCR, video camera, or laserdisc player and the picture will appear in a 1.5" x 1.8" (or 3" x 3.6" on the Professional Version) window in the corner of your Mac screen with a resolution of 128 x 108 or 256 x 216 respectively in 128-level gray scale. With its real-time display window, VCR input, MultiFinder compatibility, and HyperCard support on the Professional Version, it's ideal for video training tapes because you can watch and practice simultaneously. (Multiple cards can be networked using standard video distribution techniques.) You can also create dynamic video presentations, or monitor your favorite TV show while you work. Plus, you can capture any image and paste it to the Clipboard (in PICT 2 format) with a single keystroke—which makes it an exciting new tool for desktop publishing. The Mac has now truly entered the video age.



AAPPS

6509 MicroTV **$265.**
6695 MicroTV Professional Version . . . **399.**



A Small Step For Printers. A Giant Leap For Labels. Did you ever notice how much *stuff* you need to keep your printer happy? CoStar did. So they created **The Organizer**, a rolling storage cart for your LaserWriter II. It positions your printer at desktop height and offers storage compartments for extra paper trays, 2,000 sheets of paper, a Hard Disk font server and more. The **LabelWriter** is a tiny (3" x 6") printer designed just for labels. It prints beautiful 1" x 3½" labels with virtually no noise, comes with a DA to import and print mailing lists from most word processors, and can print machine-scannable bar code with text. Extra 130-label rolls are available, and it requires no maintenance.

CoStar ... 30 day MBG

6091 The Organizer. **$199.**
6090 LabelWriter. **185.**
6067 LabelWriter Labels **11.**



Get Some Serious Protection. Your working environment can be pretty cruel to your delicate Mac equipment. A little dust, some spilled coffee, and you've got a keyboard that's singing off-key. Why not buy a little protection? **HardTops** from Basic Needs can provide solid protection for your keyboard or ImageWriter II printer. These hard plastic covers fit easily over your equipment, and offer security against dropped objects, too—something that soft covers don't. Available in an attractive platinum color.

Basic Needs ... 60 day MBG

6681 HardTop/SE Standard Keyboard . **$15.**
6684 HardTop/SE Extended Keyboard. . **15.**
6678 HardTop/Mac Plus Keyboard. **15.**
6683 HardTop/Datadesk 101 Keyboard . **15.**
6682 HardTop/ImageWriter II **16.**



Call MacConnection 1-800/334-4444 to Order.

MAKE SURE THE POWER'S ALWAYS WITH YOU.

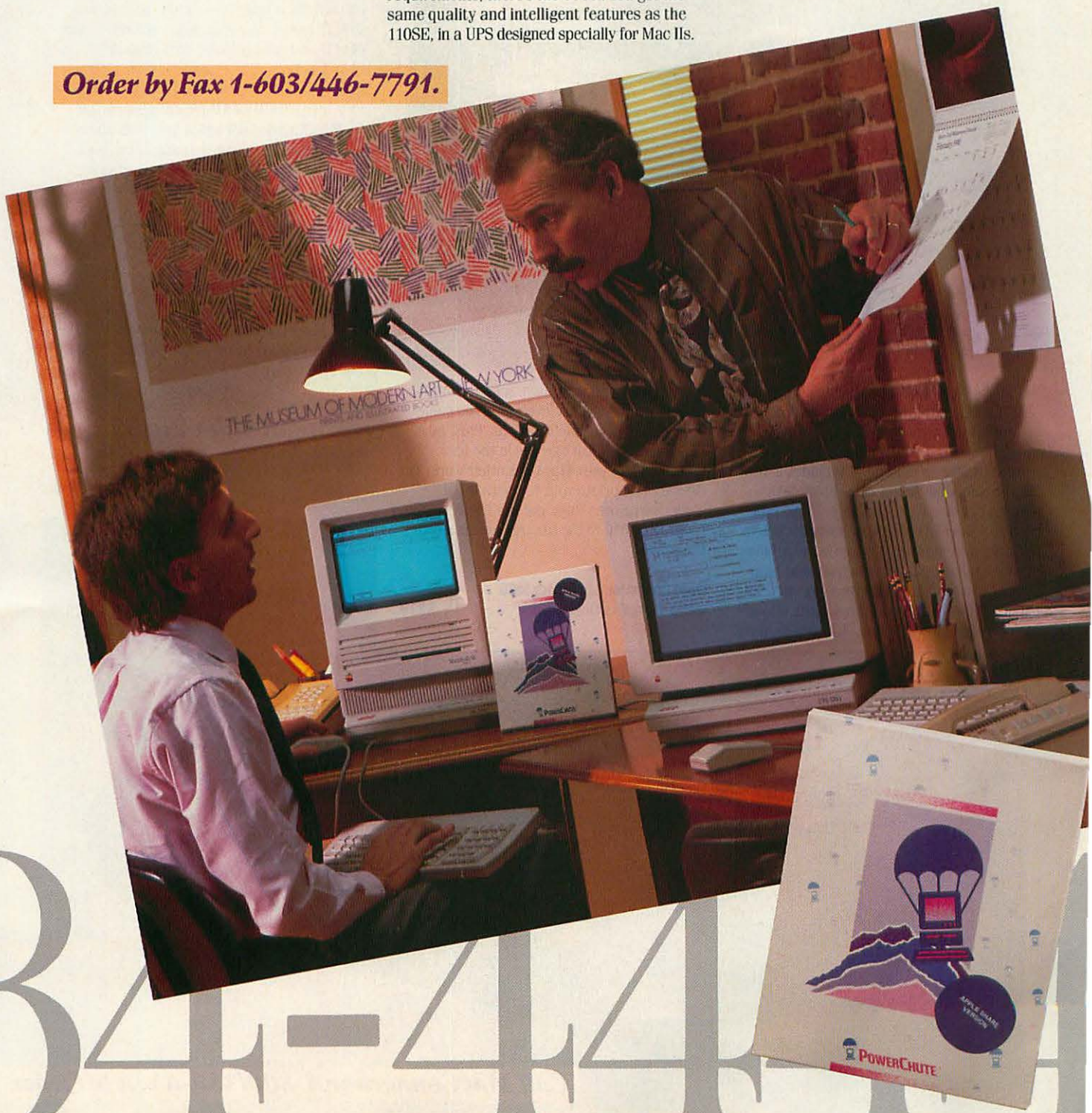
Peaceful Power. And No Interruptions. Waddaya want from life? How about some nice, clean power? That's exactly what you get in UPS (that's uninterruptible power source) systems from American Power. The **110SE** is designed *specifically* for the needs of your Mac SE, Plus, and 512. You get true sine-wave output, plenty of backup power (up to 20 minutes for a typical Mac SE), and built-in protection against spikes, surges, and brownouts. It's a zero-footprint unit that fits directly under your Mac, adding only 1½" to its height. Plus, it looks great (you don't want some ugly box sitting next to your Mac, do you?). For the Mac II family and higher power requirements, there's the **370ci**. You get the same quality and intelligent features as the 110SE, in a UPS designed specially for Mac IIs.

Network power problems? That's a job for the **PowerChute**, a UPS monitoring program for AppleShare networks. It installs easily in the Mac control panel, and uses the computer interface built into most American Power UPS systems. During a power failure, the PowerChute handles automatic, secure system shutdown so you don't have to worry about corrupt or lost data. Just finding the light switch.

American Power ... 30 day MBG

5895 110SE UPS	**$209.**
6686 370ci	**279.**
6102 PowerChute	**65.**

Order by Fax 1-603/446-7791.



34-44



HARDWARE & ACCESSORIES

Overcome Performance Anxiety. If your Mac isn't delivering enough oomph for your apps, then Dove's **MaraThon 030** upgrades can fill in the gaps. Each product is designed to provide the cure for the System 7.0 blues—performance and system flexibility. Upgrades include the *MaraThon Plus* for 16 MHz 030 Macintosh Plus performance, *MaraThon SE*, an 030 screamer for your Mac SE, and *MaraThon 030* for 32 MHz performance on your Mac II. And the **MaraThon Racer** gives your Mac II 32K of high speed cache memory. All MaraThon upgrades include Symantec's *SUM II*, the leading disk utility software, and *SAM II*, the most popular anti-virus utility on the market today. For extra ports on a Mac II family machine, try the **MaraThon MultiComm** with one parallel and three serial ports, or the **MaraThon Serial/Parallel** card with one of each. Next time you're thinking of buying a new, more powerful Mac, call us first to see what Dove can do with the one you have.

Dove Computer ... 60 day MBG

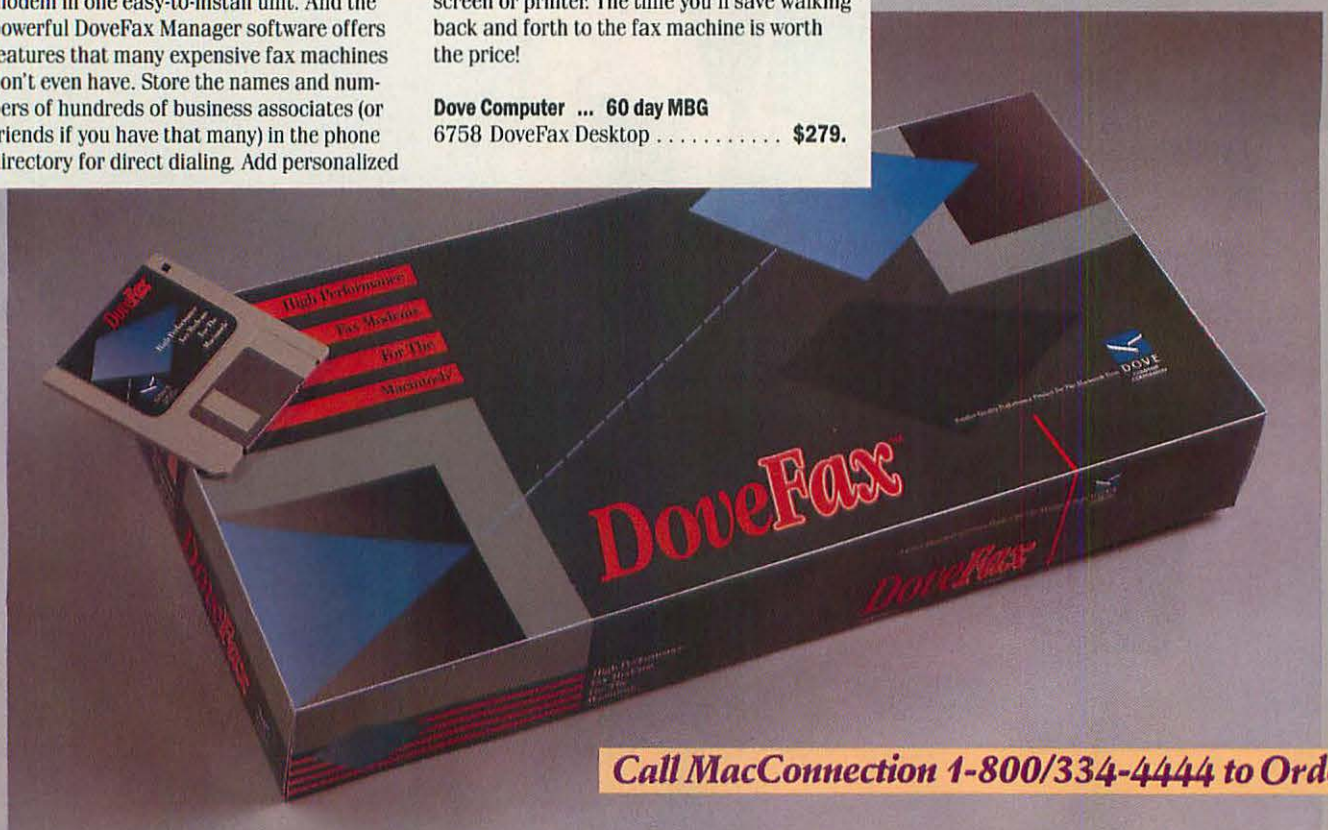
6723	MaraThon 030 for Plus	**$449.**
6724	MaraThon 030 for SE	**449.**
6725	MaraThon 030 for Mac II	**449.**
5623	MaraThon Racer	**149.**
6726	MaraThon 030 MultiComm	**319.**
6727	MaraThon 030 Serial/Parallel	**189.**

Fax To The Macs. Let your Mac do double duty as a fax machine with **DoveFax Desktop**. This combination hardware/software marvel will have you sending and receiving faxes right from your Mac in no time. It includes a 9600 baud fax modem and a 2400 baud data modem in one easy-to-install unit. And the powerful DoveFax Manager software offers features that many expensive fax machines don't even have. Store the names and numbers of hundreds of business associates (or friends if you have that many) in the phone directory for direct dialing. Add personalized cover pages with your logo, schedule unattended transmissions, even send the same document to multiple locations. Plus, all these activities can operate in the background, while your Mac does other work. The Activity Log prints your fax activity to screen or printer. The time you'll save walking back and forth to the fax machine is worth the price!

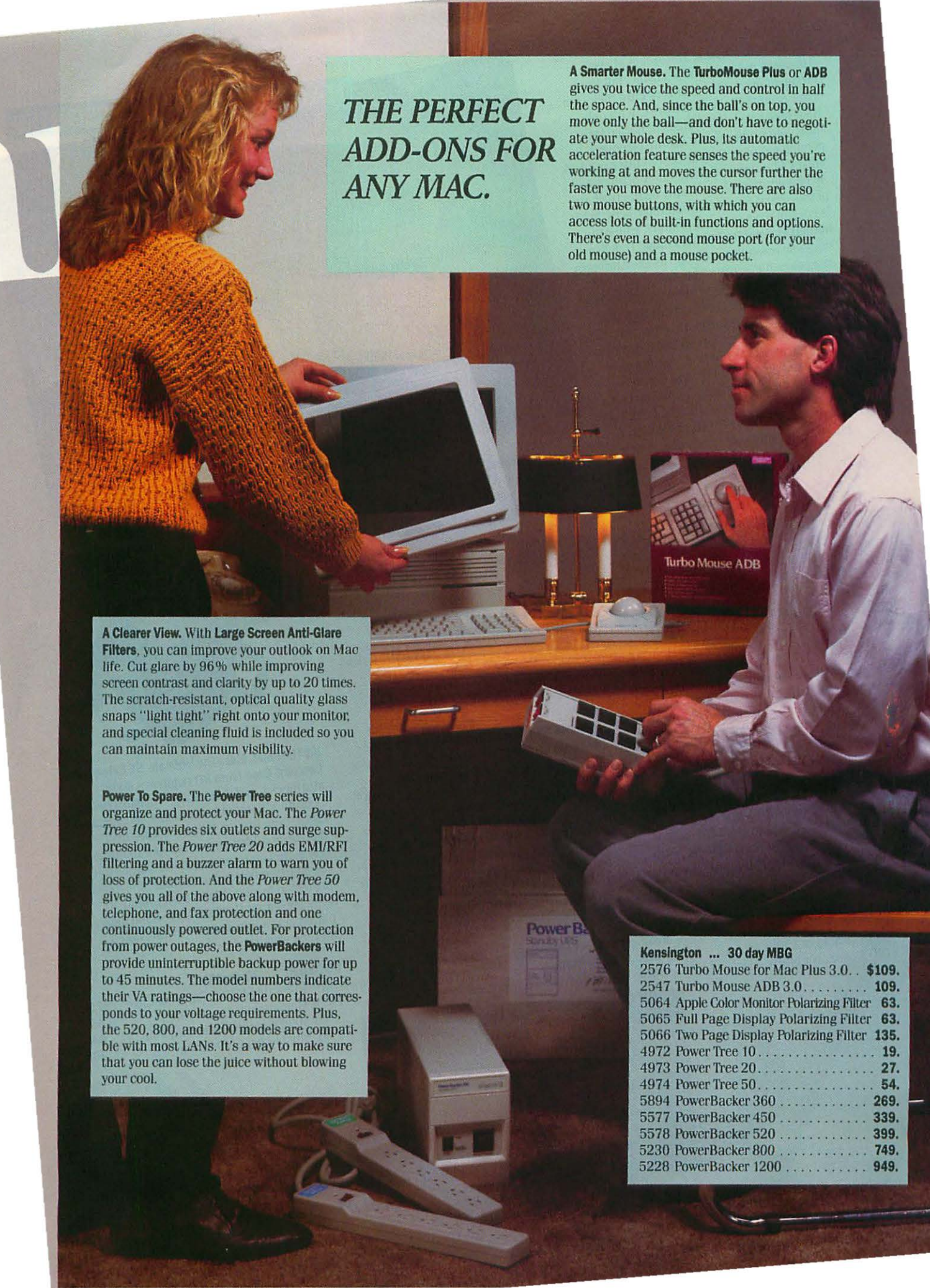
Dove Computer ... 60 day MBG

6758 DoveFax Desktop **$279.**

Overnight Shipping $3.



Call MacConnection 1-800/334-4444 to Order.



THE PERFECT ADD-ONS FOR ANY MAC.

A Smarter Mouse. The **TurboMouse Plus** or **ADB** gives you twice the speed and control in half the space. And, since the ball's on top, you move only the ball—and don't have to negotiate your whole desk. Plus, its automatic acceleration feature senses the speed you're working at and moves the cursor further the faster you move the mouse. There are also two mouse buttons, with which you can access lots of built-in functions and options. There's even a second mouse port (for your old mouse) and a mouse pocket.

A Clearer View. With **Large Screen Anti-Glare Filters**, you can improve your outlook on Mac life. Cut glare by 96% while improving screen contrast and clarity by up to 20 times. The scratch-resistant, optical quality glass snaps "light tight" right onto your monitor, and special cleaning fluid is included so you can maintain maximum visibility.

Power To Spare. The **Power Tree** series will organize and protect your Mac. The *Power Tree 10* provides six outlets and surge suppression. The *Power Tree 20* adds EMI/RFI filtering and a buzzer alarm to warn you of loss of protection. And the *Power Tree 50* gives you all of the above along with modem, telephone, and fax protection and one continuously powered outlet. For protection from power outages, the **PowerBackers** will provide uninterruptible backup power for up to 45 minutes. The model numbers indicate their VA ratings—choose the one that corresponds to your voltage requirements. Plus, the 520, 800, and 1200 models are compatible with most LANs. It's a way to make sure that you can lose the juice without blowing your cool.

Kensington ... 30 day MBG

2576	Turbo Mouse for Mac Plus 3.0	**$109.**
2547	Turbo Mouse ADB 3.0	**109.**
5064	Apple Color Monitor Polarizing Filter	**63.**
5065	Full Page Display Polarizing Filter	**63.**
5066	Two Page Display Polarizing Filter	**135.**
4972	Power Tree 10	**19.**
4973	Power Tree 20	**27.**
4974	Power Tree 50	**54.**
5894	PowerBacker 360	**269.**
5577	PowerBacker 450	**339.**
5578	PowerBacker 520	**399.**
5230	PowerBacker 800	**749.**
5228	PowerBacker 1200	**949.**

300 DPI In Your Reach. The dream of every American may be to own a home, but the dream of every Mac user is to have their own laser printer. Right on the desk. With only their own love letters, maps of buried treasure, and proposals for hostile takeovers coming out of it. But the cost of laser printers makes that impossible for many businesses. So people share. Now, it may be fun to share pizzas, great mysteries, and rototillers, but it is not fun to share laser printers. Enter the **Hewlett Packard DeskWriter Printer**. It delivers the same resolution (300 dpi) as laser printers at a price that's affordable enough for every workstation. And, when run with *Adobe Type Manager*, the print quality rivals that of a laser printer. You get smooth, crisp text and graphics for all your applications. It comes complete with the standard Mac fonts—Helvetica, Times, Symbol, and Courier—scaleable up to 250 points. And, you can add outline font capabilities with the DeskWriter Font Collection. It's the affordable way to put 300 dpi within the reach of everyone.



Hewlett Packard

6514 HP DeskWriter Printer **$859.**
6689 HP DeskWriter Printer & ATM Bundle **889.**



Power Without Corruption. The AC power that's the lifeblood of your Mac is probably full of spikes, noise, transients, and more—the kinds of things that can make your data do a vanishing act. **DataSavers** from Cuesta Systems provide a constant source of clean power, and provide time to shut down your system during a blackout. Model 200W offers 200 watts, 250VA in a compact unit, Model 400W is a 400 watt, 500VA low-profile system, and there's a Model 600W, providing 600 watts, 750VA. All are made in the U.S.A.

Cuesta Systems

1607 DataSaver 200W **$319.**
1608 DataSaver 400W **429.**
5130 DataSaver 600W **599.**

No Sales Tax.



Increase Your Drive. Give *any* Mac from the 512E on up the ability to read 720K DOS (or OS/2) disks on its 800K internal drive, or read/write those formats on your Apple 800K external drive with **Rapport**. Easy to use? Just plug Rapport into your disk drive port. For complete support of all Apple and IBM 3½" formats, connect Kennect's **Drive 2.4** to Rapport. Formatting options include 1.2MB on DD and 2.4MB on HD disks. 4½ Mice from *MacUser* and 1989 Eddy Awards Honorable Mention.

Kennect Technology ... 30 day MBG

5631 Rapport **$199.**
5632 Drive 2.4 *(includes FastBack II)* . **329.**

Hit The Road, Mac. The **Ultimate SE Extended Carrying Case** from I/O combines style, sturdiness, and, best of all, two extra outside pockets with room for manuals, mousepads, disks, even 8½" x 11" notebooks. Inside, there's a padded pocket for your mouse and cords, and an interior padded compartment for an extended keyboard. Your Mac itself is protected by ultra high-density foam, a water-resistant Cordura shell, hand nickel-plated chromium steel hardware, and a lifetime warranty!

I/O Design ... 30 day MBG

6129 Ultimate SE Ext. Carrying Case . **$79.**
2379 MacLuggage Imageware II **49.**
2376 MacLuggage Macinware Plus **64.**
2381 MacLuggage Macinware SE **75.**



1-800/3

Call MacConnection to Order.



Be Cordless. Be Cool. Here are two extremely sensible devices to make you and your Mac a lot more cool, calm, and collected. The **Mobius Cordless Mouse** uses infrared technology instead of a cord so you have much greater freedom of both movement and placement—which is especially useful when doing presentations. You don't even need a special mouse pad. It features a custom microprocessor for reliable high-speed operations and digital accuracy. And you can choose a "fine-tune" mode for precision cursor control or a "speed-up" mode when time is of the essence.

Mobius' **Fanny Mac QT** just slides into your Mac's handle and reduces internal operating temperatures to prolong your Mac's life. And it even has a built-in surge protector to shield your Mac against the vagaries of the powers that be. Its top-mounted power switch can be used to control both your Mac and your Fanny Mac. Plus, it's whisper-quiet, and keeps such a low profile that your Mac can still fit inside its carrying case. Definitely the cool way to be cool.

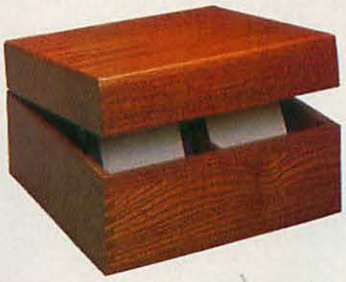
Mobius Technologies ... 60 day MBG
6126 Mobius Cordless Mouse **$95.**
4470 Fanny Mac QT **55.**

No Surcharge on Credit Card.

Get Your Mac On TRAC. Precise fingertip control and great button placement make the **MacTRAC** trackball the perfect mouse replacement. Get work done twice as fast with half the desk space. It has an ergonomic design with easy-to-locate wraparound buttons—two for click and one for click lock. Use your fingertips or thumb to click and select on the large button surfaces. 200 cpi resolution gives you precision and fast movement which works well with the Macintosh's automatic acceleration. MacTRAC is available for the Mac 512, and Mac Plus, and there's an ADB version for the Mac SE, Mac II and 030 machines.

Microspeed ... 30 day MBG
6620 MacTRAC **$65.**
6621 MacTRAC ADB **75.**





Are Your Disks Out Of Control? Do they hide under piles of paper? Do they sneak out back behind your peripherals to share their digital secrets? Are they quietly cooking on the top of your disk drive? What they need is the discipline of a **Solid Oak Disk Case**, made exclusively for us by some just-as-solid New England woodworkers down the road. It can easily keep up to 90 of your most unruly disks under control, safely, securely, and away from dirt, dust, and other hostile elements.

MacConnection ... 60 Day MBG
4623 Solid Oak Disk Case *(90 disks)* .. **$32.**



How 'Bout A Refill? Printers are ravenous little beasts, aren't they? Why they go through ribbons and toner cartridges the way bankers go through the morning mail looking for checks. And the worst thing is that, if you don't feed them, they don't work. (The printers, that is. And maybe bankers for that matter.) In any event, if you've read this far, you either have nothing else better to do or you'll be needing a refill for your printer soon. Well, you've come to the right place. We have everything from our own low-cost draft-quality **ImageWriter Ribbons** to Apple's high-performance ImageWriter Ribbons and **LaserWriter Toner Cartridges**. We even have multi-4-color ribbons for color printing on your ImageWriter II. Keep plenty on hand and keep your printer in business.

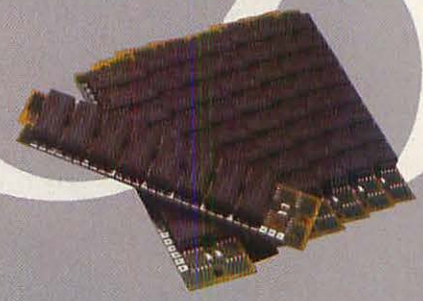
Apple Computer

1113	Black ImageWriter Ribbon	**$10.**
4890	Black ImageWriter LQ Ribbon	**18.**
1114	LaserWriter Plus Toner Cartridge	**105.**
1115	LaserWriter II Toner Cartridge	**111.**

Ribbons

Available in black, blue, brown, yellow, green, orange, purple, red, silver & gold.

3255	ImageWriter II Ribbon Black	**$4.**
3267	ImageWriter II Ribbon 6-Pack Black	**20.**
3261	ImageWriter II Ribbon Multi-4-Color	**9.**



It Pays To Be SIMMful. Stop denying yourself the capabilities of high-powered applications for want of a few Meg. Our 80ns **SIMMs** cost less than $100 per Meg and come with a *two-year warranty*. You can put up to 4 Meg in a Plus or SE (2 Meg at a time), or 8 Meg in an SE/30 on up (4 Meg at a time). Installation is easily within the reach of ordinary humans. Our SIMMs come with complete instructions and we even offer low cost toolkits to help you get under the Mac's hood. So kick your Mac into overdrive and create huge spreadsheets, complex graphics, and endless databases with speed, memory, and power to spare.

MacConnection ... 2 year warranty

1107	1 Meg, 80ns SIMM	**$89.**
4748	Mac Toolkit *(clamp & Allen wrench)*	**8.**



Pad Your Mouse. Not Your Expenses. Put something good underfoot for your mouse. **Moustrak Pads** create perfect mouse working conditions by providing a smooth surface that will keep drive rollers clean, reduce wear, and actually improve tracking performance. Think of it as wall-to-wall carpeting on your desk for your mouse. Made of open cell natural rubber, there's no annoying synthetic odor, and it won't mar the finish on your furniture. So rugged that Apple's own development lab put 1,250 mouse miles on one before it showed any wear. Buy one for yourself, give one as a gift.

Moustrak ... 60 day MBG

Available in blue (listed) or gray.

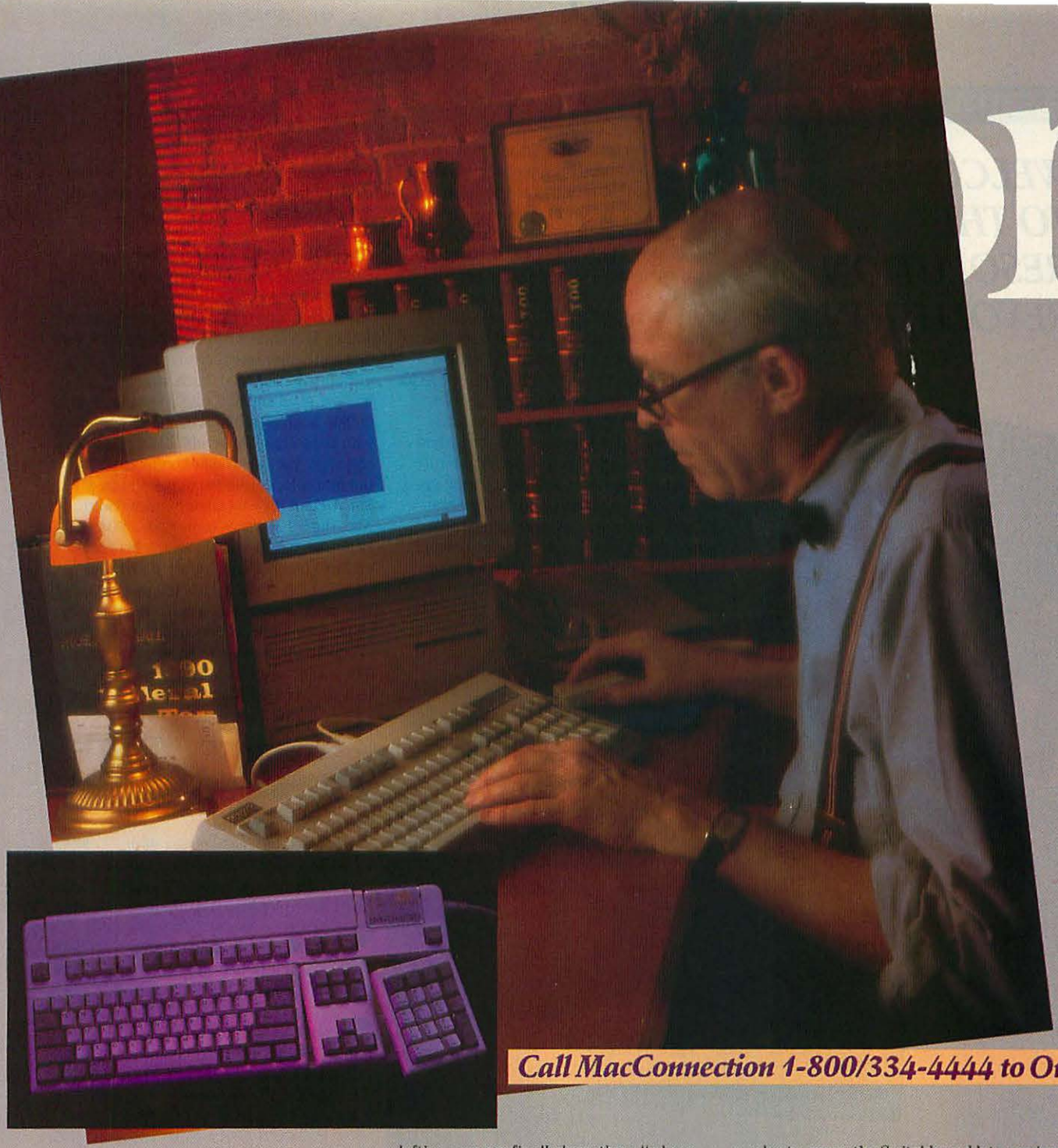
2694	Moustrak Pad *(standard 7" x 9")*	**$8.**
2692	Moustrak Pad *(large 9" x 11")*	**9.**
2693	Moustrak Pad L/F *(9" x 11")*	**10.**

Pack Some Serious Protection. Don't take your SE on the road unless you're protected with the **SE Protection Pack**. Thoughtfully designed and manufactured, the **High Trek Carry Case** is packed with 3/4" high-density, closed cell foam, with padded handle. It features plenty of pockets (one serves as an attache, and all are lined), and a waterproof Cordura nylon outershell. Also includes the *Gallery Disk Easel* that shelters 20 disks and tucks snugly into a travel pocket, and our high-quality MacAttire dust cover. All are made high in the Rockies by inveterate trekkies and techies.

Sopris Softworks ... 60 day MBG

4861	SE Protection Pak *(std. keyboard)*	**$65.**
4862	SE Protection Pak *(ext. keyboard)*	**75.**
4012	High Trek ImageWriter II Carry Case	**49.**
4013	High Trek Mac Plus Carry Case	**59.**
4014	High Trek Mac SE & Ext. Kybd. Case	**69.**
5877	Mac II Monitor Carry Case	**59.**
5839	Mac IIcx CPU & Kybd. Carry Case	**69.**





Call MacConnection 1-800/334-4444 to Order.

ANNOUNCING THE CUSTOM KEYBOARD.

Movable Modules Mean You Really Have Input. Keep up with the latest in keyboard technology with the **Switchboard**—the first modular, *user-configurable* keyboard. The alpha key, cursor key, and numeric key modules can all be moved into different positions depending on your personal preferences. (That's right, lefties, you can finally have them "where they belong!") Need a trackball? Datadesk's **Modular Trackball** is ergonomically designed for both right- and left-handed users, with two lock-down buttons on either side plus a special button for convenient thumb clicking. It's sized to replace the cursor key module (it includes the same four cursor keys) or attach to either side of the Switchboard. Prefer having function keys on the side? Just add the **Function Key Module**. It can either attach to the side of the Switchboard or replace the numeric module. If it's macro keys you prefer, snap the **Macro Key Module** in the slot above the fifteen horizontal function keys. It can be used for extra function keys, user-programmable macro keys, or configured for 3270 emulation! With these and more modules to come, the Switchboard lets you input data the way that's truly the most convenient and efficient for you. It works on all Macs including the entire Mac II family down to the Plus. (In fact, it's the only extended keyboard for the Plus.) And, it will even work on IBM-compatible XTs, ATs and PS/2s. So it's the first all-purpose keyboard for every machine in your office. Interfaces don't get much more human than this.

Datadesk ... 30 day MBG

6755	The Switchboard	**$175.**
6813	Modular Trackball	**call**
6815	Function Key Module	**call**
6814	Macro Key Module	**call**

WELCOME TO THE RESOLUTION REVOLUTION.

Make Your Mac Smart. Very Smart. That's right, the people who brought you resolution crisp enough to see the gleam in Magic Johnson's eye when he drives towards the basket, now offer a high-resolution analog color monitor for your Mac. The **9CM080 14" Color Monitor** is fully compatible with your Mac SE/30 or II equipped with a high resolution color card like the *Xceed SE/306-48* or *Xceed NB6-48* video cards shown here. You get crisp color 640 x 480 resolution in up to 256 colors from a pallete of over 16 million. The high 35 KHz horizontal scanning rate delivers an exceptionally legible image without any visible horizontal scan lines. On the up and down side, the 66.7 Hz vertical refresh rate provides a flicker-free, solid image. You get easy-access front controls for brightness, contrast, and horizontal and vertical positioning, along with separate horizontal and vertical size controls on the back for adjusting the size of the displayed image. And, it comes complete with a tilt/swivel base and cable. Your color display choices couldn't be any clearer than this.

Exceed The Mac's Video Limits. Whether you're looking to drive the high performance 640 x 480 resolution of the *Magnavox 14" Color Monitor* or need the precision resolution of 1024 x 768, there's a Micron **Xceed Video Card** that will deliver on either your Mac SE/30 or any Mac II. All Xceed Cards offer 1, 2, 4, or 8 bits per pixel and 256 colors from the full 16 million + palette, and are fully compatible with *Color QuickDraw* and *32-bit QuickDraw* software. They also come complete with a Gamma color correction utility and free *MacroPaint* 8/24-bit color paint software. And, the SE/30 cards come with an On/Off switch to make it easy to switch between a multiple monitor configuration and your single SE/30 monitor. How reliable are they? Well, Micron manufactures its own memory chips, tests each product under a wide range of conditions, and backs them with a toll-free hotline. Overall, Micron's proven it's easy to Xceed the Mac's video capabilities.



Micron ... 30 day MBG

6680 Xceed for SE/30 *(640 x 480)* . . . **$349.**
6690 Xceed for SE/30 *(640 x 480)* and Magnavox 14" Color Monitor . . . **849.**
6679 Xceed for Mac II *(640 x 480)*. . . . **349.**
6691 Xceed for Mac II *(640 x 480)* and Magnavox 14" Color Monitor . . . **849.**
6673 Xceed for SE/30 *(1024 x 768)* . . . **589.**
6672 Xceed for Mac II *(1024 x 768)*. . . **589.**

Magnavox

6693 9CM080 14" Color Monitor . . . **$529.**
6690 14" Color Monitor with Micron Xceed for SE/30 *(640 x 480)*. . . ***special*** **849.**
6691 14" Color Monitor with Micron Xceed for Mac II *(640 x 480)*. . . ***special*** **849.**

Call MacConnection 1-800/334-4444 to Order.

REDUCE SCREEN RADIATION UP TO 98%.

Radiational Cooling. The popular Curtis line of video display filters has been enhanced to include radiation protection. And, if you've been following the studies in the press about the potential health hazards of VLF (very low frequency) radiation, you know how important that is. The **Curtis Glass Filter Plus** actually *absorbs* up to 98% of VLF radiation, and meets or exceeds Swedish and International standards (you know how fussy *they* are). Plus, Curtis filters continue to protect you in lots of other ways. For example, glare can make it difficult to concentrate, and can contribute to neck and shoulder pain, irritability, and even impaired vision. These filters reduce glare significantly (as well as the problems it causes) by absorbing 95% of reflected glare without reducing brightness. You get a sharper, clearer image on your screen, and your eyes will thank you. All Curtis Filters are distortion-free optical glass (not plastic or mesh). They're easy to install with the enclosed Velcro fasteners. Plus, the detachable 6-ft. grounding cable dissipates harmful static electricity. Why use anything else? In seven different sizes to fit almost any monitor. At a small price to pay for the protection and comfort.

Curtis Manufacturing

Curtis Glass Filter Plus *(Inside frame dimensions indicated below)*

6731	GFP-1 *(6¾" x 9¼", for Apple Hi Res Color or Monochrome Monitor)*	**$65.**
6732	GFP-2 *(8¼" x 11½")*	**65.**
6733	GFP-3 *(6" x 8", for Plus or SE)*	**65.**
6734	GFP-4 *(7¼" x 10¼")*	**65.**
6735	GFP-5 *(8" x 10½")*	**65.**
6736	GFP-6 *(8⅞" x 11")*	**65.**
6737	GFP-7 *(9" x 12¼")*	**65.**



HARDWARE & ACCESSORIES



Spin Some Facts. Or Try Some Tunes. Isn't it about time you tapped into some new potential for your Mac? Well, check out the **XM-3201 CD-ROM drive.** This plug-and-play system provides everything you need to use the growing library of incredible CD-ROM software titles. You get a high-quality, reliable CD-ROM drive (from Toshiba), Mac software driver, SCSI interface cable, terminator, installation manual—even a sample disk. Every ROM disk can hold up to 600 Meg—the equivalent of almost 30,000 pages of text. And it includes high-fidelity audio so you can listen to your favorite music on compact discs, too!

Toshiba
6749 XM-3201 CD-ROM drive **$899.**



Toe-Tapping Trackball. Keep everything under perfect control with the **Kraft ADB Trackball.** It fits neatly next to your keyboard and provides superb cursor control without using up cherished desk space. Three switchable cursor speeds let you choose the response range that's right for your applications—at speeds a mouse can't match. Easy to install and ultra-reliable, the Trackball is backed by a five year-warranty. It comes with a foot pedal for toe-tapping control of clicking and dragging operations.

Kraft Systems ... 60 day MBG
6099 ADB Trackball *(with foot pedal)* . **$79.**

Call MacConnection 1-800/334-4444 to Order.

No Sales Tax.

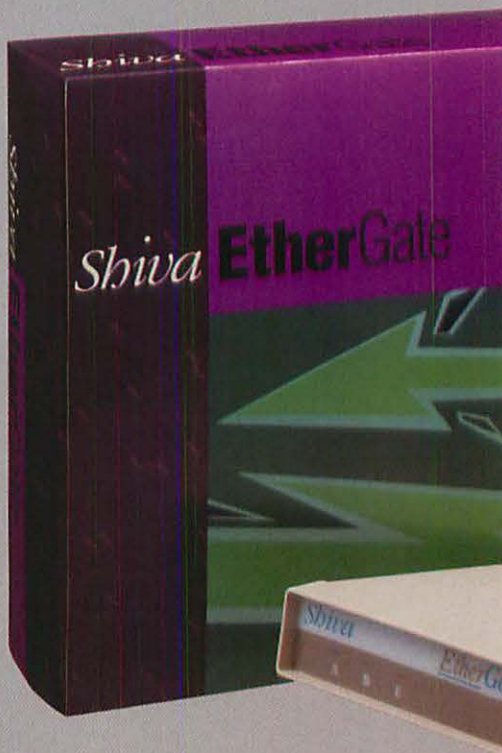


Palm-Sized Scan Power. Adding a scanner doesn't mean cluttering your desktop when you buy the **ScanMan Mac Model 32.** It gives you big-time scanning power in a hand-held package—1/2 page scanning width and as much length as you can fit in memory. It has selectable 72-400 dpi (or custom) resolutions, support for PICT/PICT2, TIFF, and EPSF formats, and much more. New in Model 32 are true grey scaling (32 shades), a new design, and the ability to scan red images and text. And it comes with a DA that provides editing tools including rotating, inverting, cropping, grey scale editing, and a tear off tool palette.

Logitech ... 30 day MBG
5082 ScanMan Mac Model 32 **$319.**

Major League Networking. Shiva's **EtherGate** can expand your network options in a big way. This EtherTalk/LocalTalk/serial gateway has thick and thin Ethernet ports (only one is used at a time) and two serial/LocalTalk ports. That means you can configure EtherGate with more connections than The Godfather. Now your EtherTalk and LocalTalk networks can be combined into a single, more powerful network, using dial-up lines, dedicated lines, or even ISDN links. Set up local and remote EtherTalk/LocalTalk routing or Dial-In Network Access from remote Macs or PCs. Plus, your Macs and PCs can share printers, plotters, modems, or other serial devices over EtherTalk or LocalTalk. 1989 *MacUser* Eddy Award Honorable Mention!

Shiva ... 30 day MBG
6519 EtherGate. **$1629.**

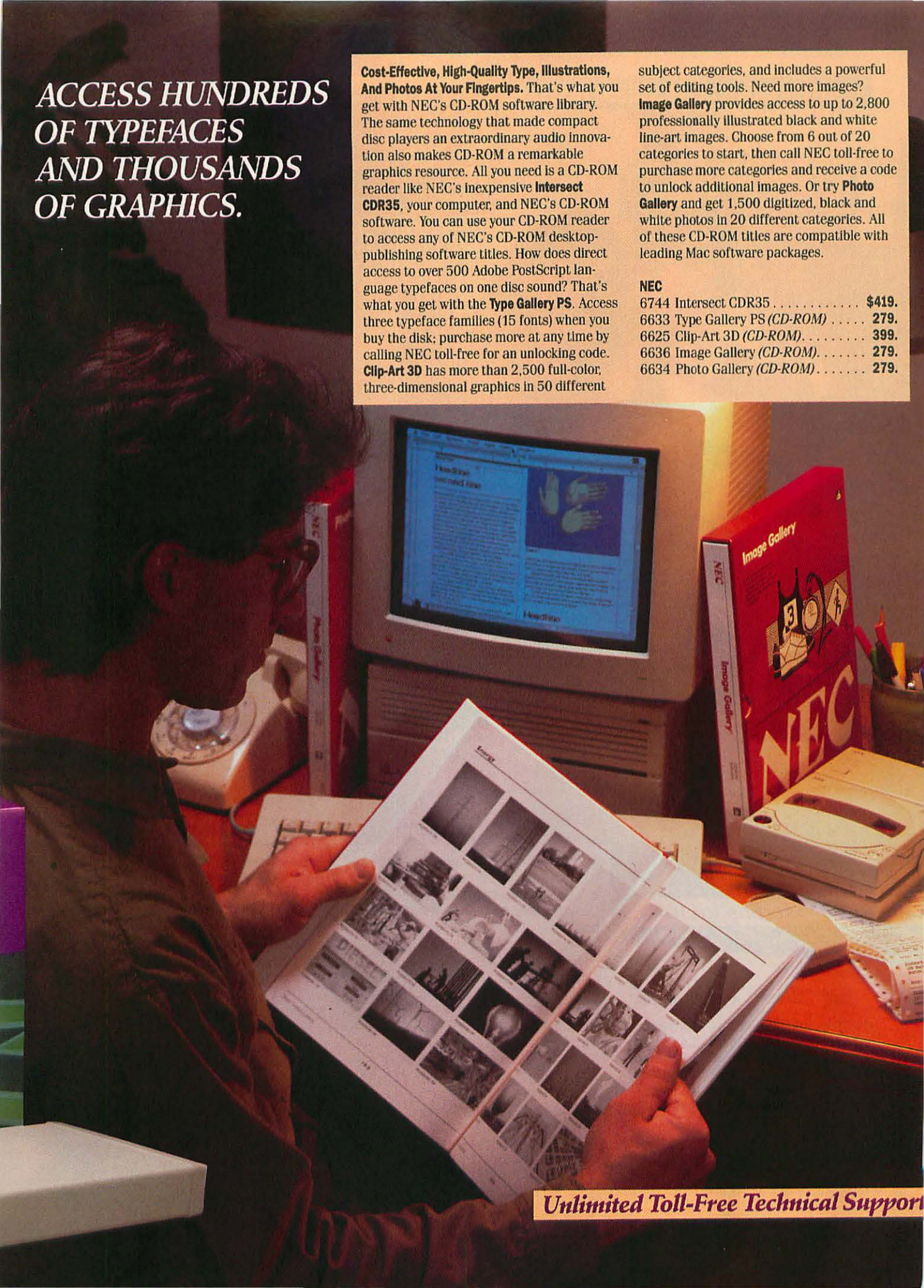


ACCESS HUNDREDS OF TYPEFACES AND THOUSANDS OF GRAPHICS.

Cost-Effective, High-Quality Type, Illustrations, And Photos At Your Fingertips. That's what you get with NEC's CD-ROM software library. The same technology that made compact disc players an extraordinary audio innovation also makes CD-ROM a remarkable graphics resource. All you need is a CD-ROM reader like NEC's inexpensive **Intersect CDR35**, your computer, and NEC's CD-ROM software. You can use your CD-ROM reader to access any of NEC's CD-ROM desktop-publishing software titles. How does direct access to over 500 Adobe PostScript language typefaces on one disc sound? That's what you get with the **Type Gallery PS**. Access three typeface families (15 fonts) when you buy the disk; purchase more at any time by calling NEC toll-free for an unlocking code. **Clip-Art 3D** has more than 2,500 full-color, three-dimensional graphics in 50 different subject categories, and includes a powerful set of editing tools. Need more images? **Image Gallery** provides access to up to 2,800 professionally illustrated black and white line-art images. Choose from 6 out of 20 categories to start, then call NEC toll-free to purchase more categories and receive a code to unlock additional images. Or try **Photo Gallery** and get 1,500 digitized, black and white photos in 20 different categories. All of these CD-ROM titles are compatible with leading Mac software packages.

NEC

6744	Intersect CDR35	**$419.**
6633	Type Gallery PS *(CD-ROM)*	**279.**
6625	Clip-Art 3D *(CD-ROM)*	**399.**
6636	Image Gallery *(CD-ROM)*	**279.**
6634	Photo Gallery *(CD-ROM)*	**279.**



Unlimited Toll-Free Technical Support



THE BEST BUY ON DRIVES.

Call MacConnection to Order.

	MTBF*	AAT†	MDTR‡
20+ Meg	100,000	65ms	1.5 meg/sec
30+ Meg	70,000	28ms	1.5 meg/sec
45+ Meg	70,000	28ms	1.5 meg/sec
65+ Meg	100,000	28ms	1.5 meg/sec
80+ Meg	100,000	28ms	1.5 meg/sec
45 Meg (Removable)	35,000	20ms	1.25 meg/sec

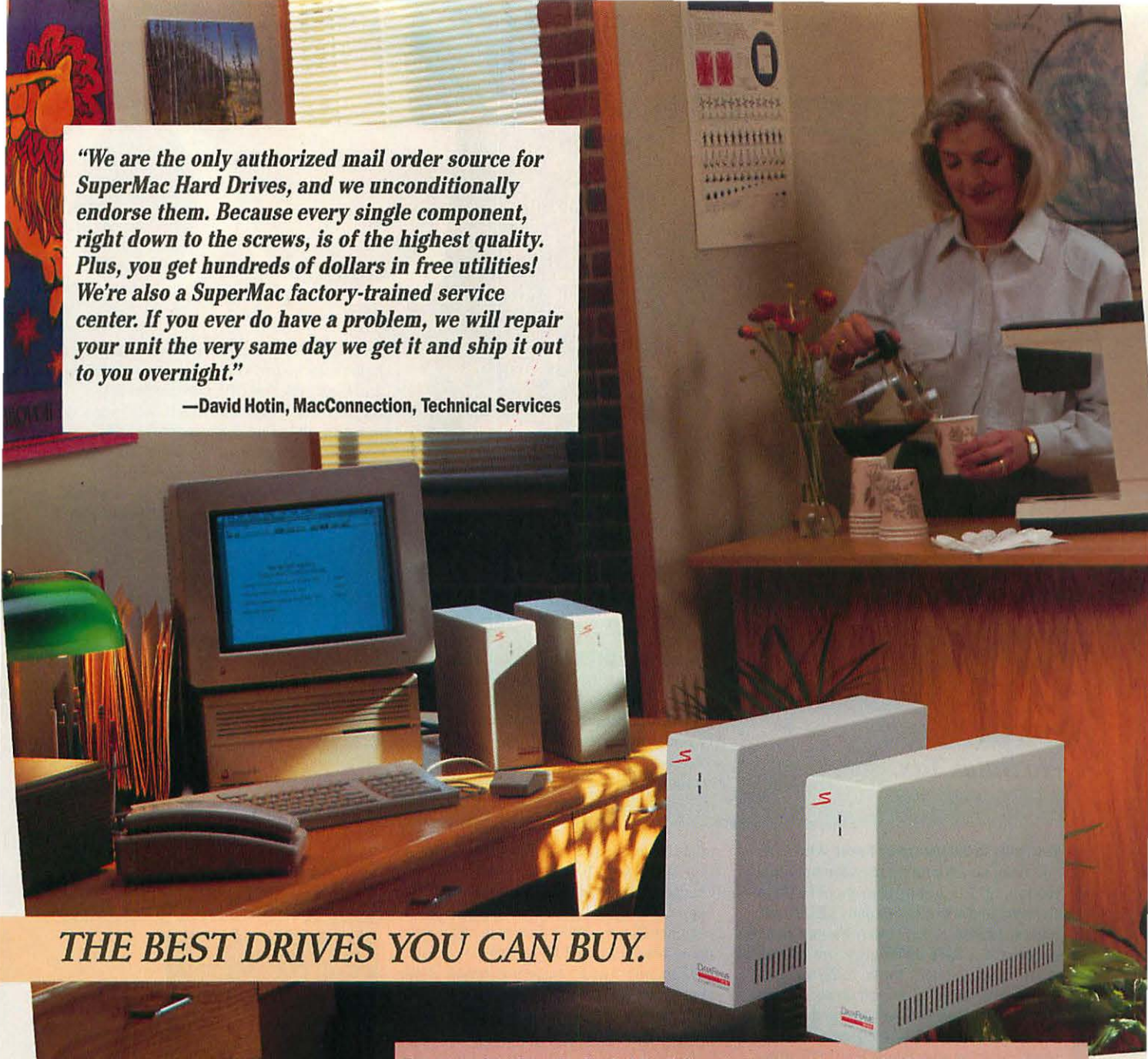
*Mean Time Between Failure
†Average Access Time
‡Maximum Data Transfer Rate

From 20 to 80+ Meg. At Unbelievable Prices. If you're looking for the best possible price on a dependable hard drive for your home or small business, take a look at **Cutting Edge Hard Drives**. Because out in the hills of Wyoming, this company has pioneered budget-conscious mass storage for the masses. Each of their drives comes pre-formatted and ready to boot, and the head parks itself automatically when you power down for longer drive life and protection during transit. And, as your storage needs increase, you can daisy chain additional SCSI drives for multi-megabytes of storage.

Cutting Edge ... 30 day MBG	
5133 20+ Meg Hard Drive	**$359.**
3990 30+ Meg Hard Drive	**429.**
3991 45+ Meg Hard Drive	**489.**
5275 60+ Meg Hard Drive	**589.**
5276 80+ Meg Hard Drive	**649.**

Unlimited Storage On A Limited Budget. Now, if you're the kind of user for whom 45 Meg is all in a day's work, you should be looking at Cutting Edge's **45 MB Removable Hard Drive**. Whenever you need another 45 Meg of storage, just pop in an additional cartridge. You get the dependable *SyQuest* mechanism found in high-end removable drives at a low price typical of all Cutting Edge products. The average access time of 20 ms and data transfer speed of 1.25 megabytes per second make it fast enough to use for backup purposes or as your system's daily hard drive. It's also a great way to take huge amounts of data with you when you travel. All the storage you'll ever need at a very competitive price.

Cutting Edge ... 30 day MBG	
5456 45 Meg Removable Drive	**$799.**
5736 45 Meg Removable Cartridge	**109.**



"We are the only authorized mail order source for SuperMac Hard Drives, and we unconditionally endorse them. Because every single component, right down to the screws, is of the highest quality. Plus, you get hundreds of dollars in free utilities! We're also a SuperMac factory-trained service center. If you ever do have a problem, we will repair your unit the very same day we get it and ship it out to you overnight."

—David Hotin, MacConnection, Technical Services

THE BEST DRIVES YOU CAN BUY.

No Hidden Charges.

	MTBF*	AAT†	MDTR‡
XP30	70,000	28ms	1 meg/sec
XP60	70,000	28ms	1.5 meg/sec
XP100	50,000	19ms	2 meg/sec
XP150	150,000	17ms	1.5 meg/sec
XP330	150,000	17ms	2 meg/sec

*Mean Time Between Failure
†Average Access Time
‡Maximum Data Transfer Rate

Uncompromising Drive Quality. And The Software To Keep It Humming. Sure, SuperMac Drives cost a little more. But, remember, next to your Mac itself, a hard drive is probably the most important investment you'll make in your system. Put your money on a **DataFrame Drive** and you'll be paid back with years of error-free service. They feature average access times as low as 17 ms, and data transfer rates up to two Meg per second. And, since they're external drives, they'll be compatible with any Mac you buy in the future. Or, you can add storage to your current system by daisy chaining up to six more DataFrames using the second SCSI connector. They come pre-formatted—just connect one to your SCSI port and turn on the power. Plus, with every drive, you get the software you need for maximum performance. Free. SuperMac's *DataFrame Manager* includes three levels of data security (file locking, password protection, and data encryption), and true SCSI partitioning so you can store A/UX system files on the same drive as standard files. You also get free copies of *SuperLaserSpool*, *SuperSpool*, and their *DiskFit* backup program. If you're ready to make a serious investment in a hard drive, you can't get much more serious than SuperMac.

SuperMac Technology ... 30 day MBG

5447 DataFrame XP30 **$599.**
5448 DataFrame XP60 **799.**
5449 DataFrame XP100 **1049.**
5450 DataFrame XP150 **1399.**
5451 DataFrame XP330 **2399.**
(All come with free Disk Manager, DiskFit, SuperSpool, and SuperLaserSpool)



The Inside Story On Disks. A disk is a disk right? Sure, until a minor imperfection causes a major headache. You need disks you can rely on. Sony developed the **3½" Floppy Disk** in the late '70s, pioneering the protective Safety Auto Shutter and the heat-resistant hard-shell design. And they continue to set new standards with features like high-performance VIVAX magnetic particles and their exclusive DDL particle binding tape coating technology which disperses the magnetic particles evenly to inhibit the chance of data errors. And now you can get that same DDL technology combined with anti-thermal materials in **Sony Data Cartridges** for the highest data integrity and protection against high humidity, severe heat, dust, and dirt. Plus an ultra-stabilizing belt-drive ensures stable tape tension for reliable data reception even at high speeds. Whether you're backing up kilobytes or megabytes every day, you can rely on Sony. Whew!

Sony ... 60 day MBG

3297 3½" DS/DD Disks *(10)*	**$13.**
6148 3½" DS/DD Disks 3 Pak *(30)*	**30.**
3298 3½" HD Disks 1.44 Meg *(10)*	**24.**
6375 3½" HD Disks 3 Pak *(30)*	**60.**
6659 QD 2000 40 MB Data Cartridge	**19.**

No Sales Tax.

Two Paths To Uninterrupted Power. Whether you're looking for an inexpensive but highly reliable UPS, or a slim, trim, model with all the bells and whistles (actually LEDs and audible alarm), SAFE Power Systems has the solution. The **SAFE 250W** gives you 250 watts of true backup power for up to 25 minutes. The audible alarm gives you plenty of warning of AC fluctuations so you can make an orderly shut-down. It's sized for a LAN workstation or standalone Mac with monochrome monitor. For more sophisticated protection the **SAFE 400S** delivers uninterrupted true sine wave AC power for 6 to 20 minutes, along with complete status information. One set of LEDs shows how much charge remains. Another shows how much capacity is left for additional watt-hungry peripherals (the 400S eliminates any worries about whether your UPS is correctly sized). Both models feature surge protection, a two-year warranty, and three-year battery life with automatic recharging. Either way you'll always be SAFE and not sorry.

SAFE Power Systems

4561 SAFE 250W	**$269.**
6747 SAFE 400S	**409.**



TOOLS OF THE TRADE



Get Into It. How do you get into a corrupted file, or any file, without the application? Simple. If it's on your Mac, then **CanOpener** can get into it. This incredibly ingenious search-and-retrieval utility lets you grab text, images, even sound from any document. Version 1.1 is 200%-300% faster, supports additional picture formats, and can print retrieved data directly. You can also browse and locate files by content. With CanOpener, there's always a way in when it looks like there's no way out. 1989 Eddy Award winner for Best File-Management Utility.

Abbott Systems ... 30 day MBG
5236 CanOpener 1.1 **$64.**



Replay Your Best Strokes. Record any series of keystrokes or "mousestrokes" and **Tempo II** will make it a macro. Then, a single command replays the entire sequence, from a simple font change to hundreds of steps. Tempo II records menu selections by name for accurate replay, and gives you seven great ways to play your macros. Run commands at specific times, wait for user prompts, launch or switch to programs and files, link macros, repeat macros, and otherwise automate your Macintosh work. Eliminate routine from your life with Tempo II.

Affinity Microsystems ... 60 day MBG
1016 Tempo II 1.02 **$75.**



The Quickest Way From Here To There. Don't waste time looking for folders and files, take a **Shortcut**. This ingenious INIT/cdev appears in every application's *Open* and *Save* dialogs, and can find just about any file super-quick. It even finds and decompresses files in *StuffIt* archives. It quickly and easily creates new folders without using Finder, and places commonly used folders and files on a menu for immediate access. Handles many other valuable file operations, too. No wonder *MacUser* gave it 5 Mice and a 1989 Eddy Honorable Mention.

Aladdin Systems ... 30 day MBG
6169 Shortcut 1.0.2 **$46.**

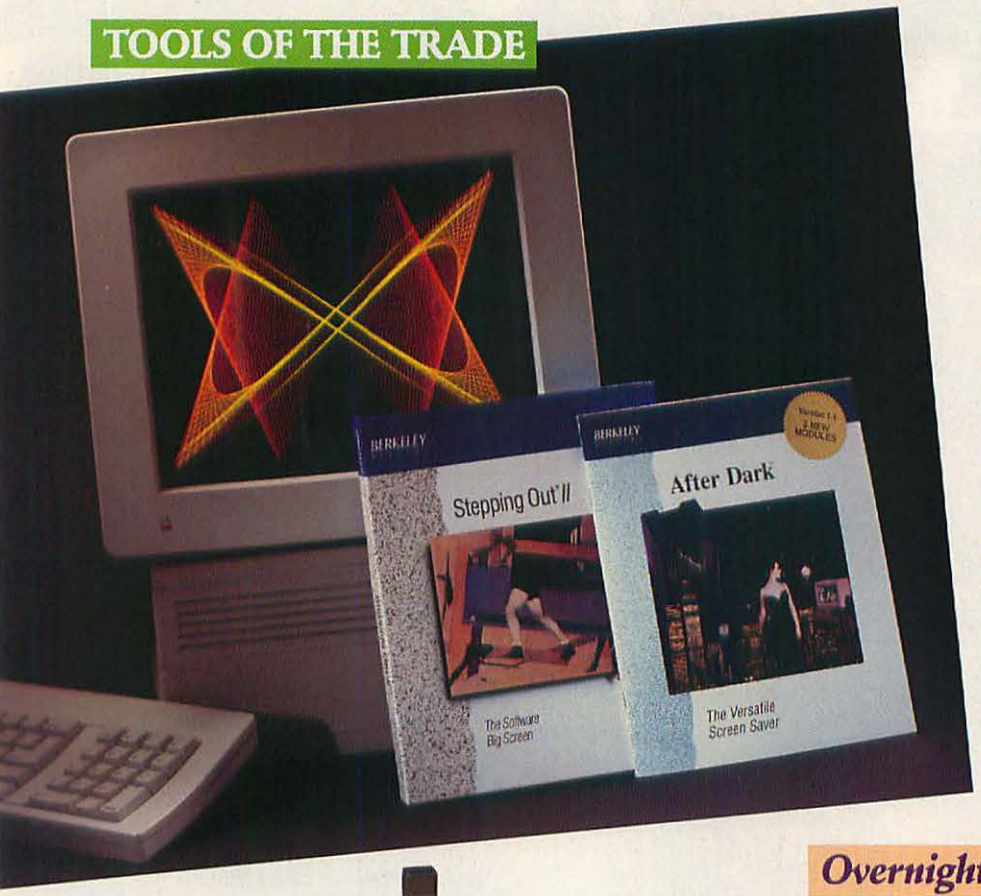
HARDWARE & ACCESSORIES



It's All In The Bag. There comes a point in every young Mac's life when it's time to hit the long and winding road. **Targus Carry Cases** can help smooth that journey, whether you make it every day, or once a year. The **Mac SE & Extended Keyboard Carry Case** is custom designed for your Mac Plus/SE with an extended keyboard. A special padded compartment cushions your fragile hard disk with two layers of impact-absorbing foam. Joe Montana should have it so good! There's also a removable padded case for the extended keyboard, and plenty of pockets for modems, manuals, and other doodads. Made of a special static and water-resistant material that's as strong as Cordura, but a lot smoother (your clothes will thank you). Targus also offers cases for the Mac IIcx/ci, ImageWriter II, and Mac Plus/SE (without extended keyboard) which share similar construction and protective claims to fame.

Targus ... 60 day MBG
3618 ImageWriter II Carry Case **$45.**
3617 Mac Plus/SE Carry Case **55.**
4015 Mac SE & Ext. Kybd. Carry Case . **69.**
6116 Mac IIcx Carry Case **75.**

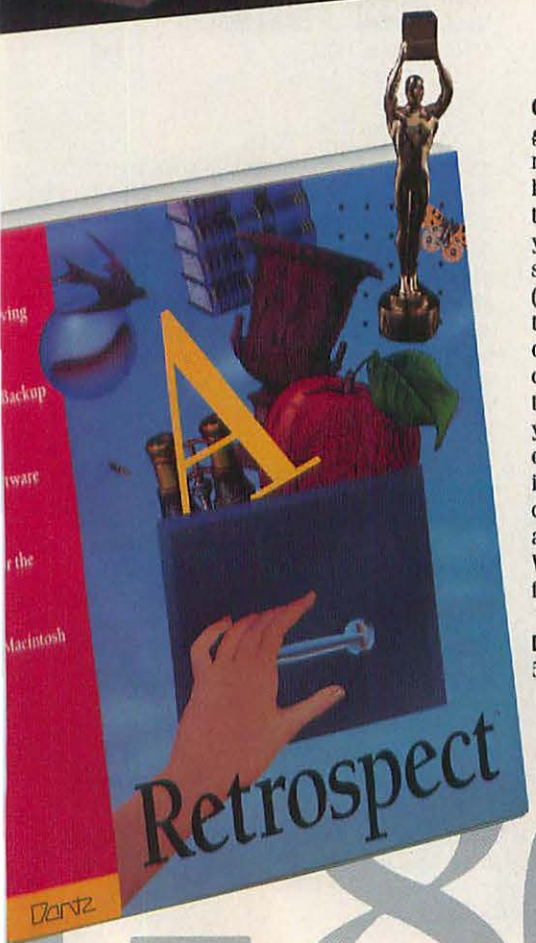
Call 1-800/334-4444 to Order.



As Big As You Want It. Without Getting Burned. **After Dark** prevents phosphor burn-in when you leave your Mac unattended. Version 1.1 offers *18* far-out animated images. Choose from lightning bolts, crawling worms, or abstract art. Adjust the provided images, or create your own—even use your company logo. Password protection keeps out snoops, and means only you can reactivate your Mac. "Truly the Ferrari of screen savers," says *MacWEEK*. Get a bigger picture without changing your monitor with **Stepping Out II**. This software utility makes your Mac screen a window into a larger "virtual" screen. See any part of your document by simply moving your mouse. Zoom down to see the entire image, or zoom up to any size display you want. Easy to install and use, it provides the benefits of a large screen monitor without the expense (or bulk). Received a 5 Mice rating from *MacUser*.

Berkeley Systems ... 30 day MBG
5737 After Dark 1.1 **$22.**
1541 Stepping Out II 2.02 **49.**

Overnight Shipping $3.

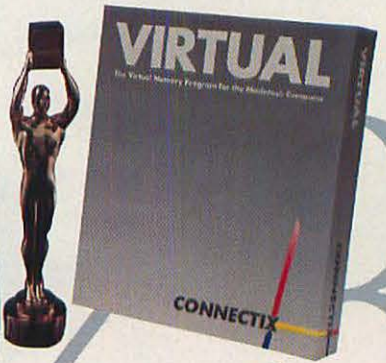


Cleanup While You Backup. Backing up is great for data security. But it doesn't do much for that clutter on your desktop and hard drive. **Retrospect** gives you the organizational power to do true archiving. Naturally, you can use it just to backup. But it really shines when you tell it to put all those rarely (if ever) used files onto tapes, optical cartridges, file server volumes (or even humble disks). Because, while it's doing so, it's also creating a complete catalog of exactly where those files can be found whenever, if ever, you need them. Compatibility? If it can hold data, Retrospect can archive or back up to it. And it features data encryption, data compression, full AppleTalk network support, and a calendar for unattended backups. Winnner of the 1989 *MacUser* Eddy Award for Best Backup Software.

Dantz Development ... 30 day MBG
5255 Retrospect 1.1 **$149.**

More Bytes, Less Bucks. Smash through the eight megabyte barrier with **Virtual 2.0** without shelling out dollars for memory chips. This virtual memory software for your Mac (II family and SE/30) turns hard disk space into the equivalent of up to 14 megabytes of RAM so you can run tons of memory-hogging software concurrently under MultiFinder, and save your money for something else. The Mac II version includes a PMMU chip to make your Macintosh System-7-ready now. Winner of an Eddy as Best General Utility from *MacUser* (3/90).

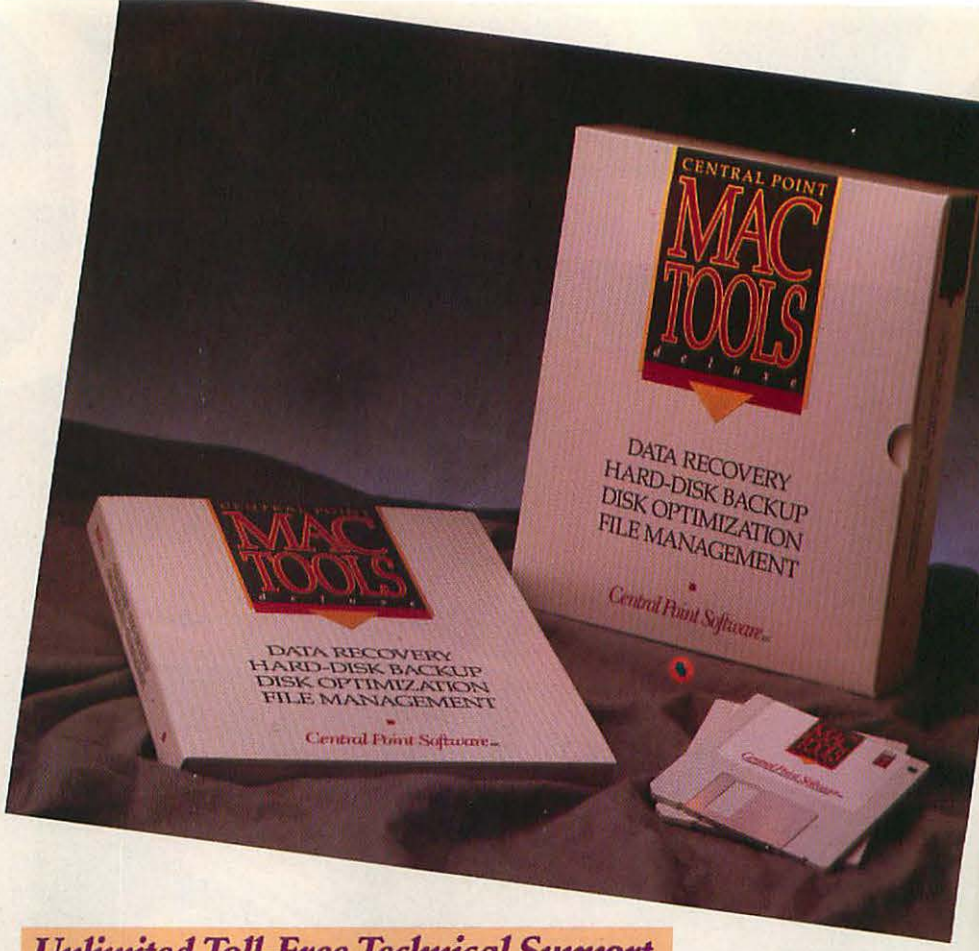
Connectix ... 30 day MBG
6123 Virtual 2.0 *(for SE/30, IIcx, IIx & IIci)* **$115.**
6122 Virtual 2.0 *(for Mac II, incl. PMMU)* **188.**



1-800/3

C.P.R. For Disks. Introducing **MacTools Deluxe**, the most powerful, comprehensive collection of Macintosh utilities ever placed on a disk. MacTools Deluxe is designed to recover your lost data, backup your hard disk, enhance the performance of your Macintosh, and help you manage your files. It recovers deleted files and crashed disks quickly and easily, even letting you view a file's contents before recovery. MacTools' Backup provides fast, easy, and reliable hard disk backup. The Optimizer defragments files and consolidates space on your hard disk, reducing disk accesses and speeding data retrieval. File and disk management utilities can locate files fast, partition your hard disk, speed up floppy copying, and safeguard your files with password protection and encryption.

Central Point ... 30 day MBG
5041 MacTools Deluxe. **$75.**





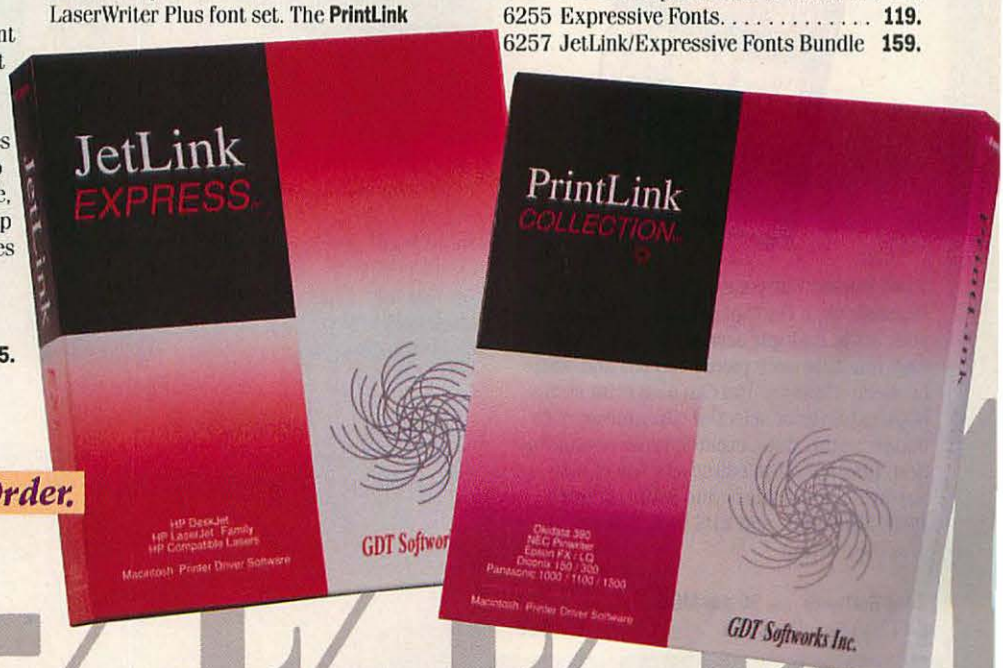
Use It. Don't Lose It. You just *know* it's there somewhere, right? That incredibly important file about Jim somebody that your boss just asked for. Or next quarter's budget, or a phone number. But where? No sweat. **GOfer** will find it fast. This super little DA searches through disks, hard drives, or file servers to find your file—displaying the text of the file, and the location. And even partial clues help it scrutinize places you didn't even know files could hide.

Microlytics ... 60 day MBG
2732 GOfer 2.0 **$45.**

Unlimited Toll-Free Technical Support.

Connect To Virtually Any Printer. Getting your Mac to talk to a non-Apple printer can turn you into a serious malcontent. A better alternative is **JetLink Express**, a software driver for connecting to the HP DeskJet and LaserJet (or compatible) printers. It uses outline font technology to produce PostScript-like fonts, and supports internal fonts and cartridges. You get 13 fonts and can add **Expressive Fonts** for the total LaserWriter Plus font set. The **PrintLink Collection** is a series of drivers for dot matrix printers from *Epson, NEC, Panasonic,* and others. It's *Adobe Type Manager* compatible, supports internal fonts, and includes a serial cable. This is the smart way to put your PC printer back in business.

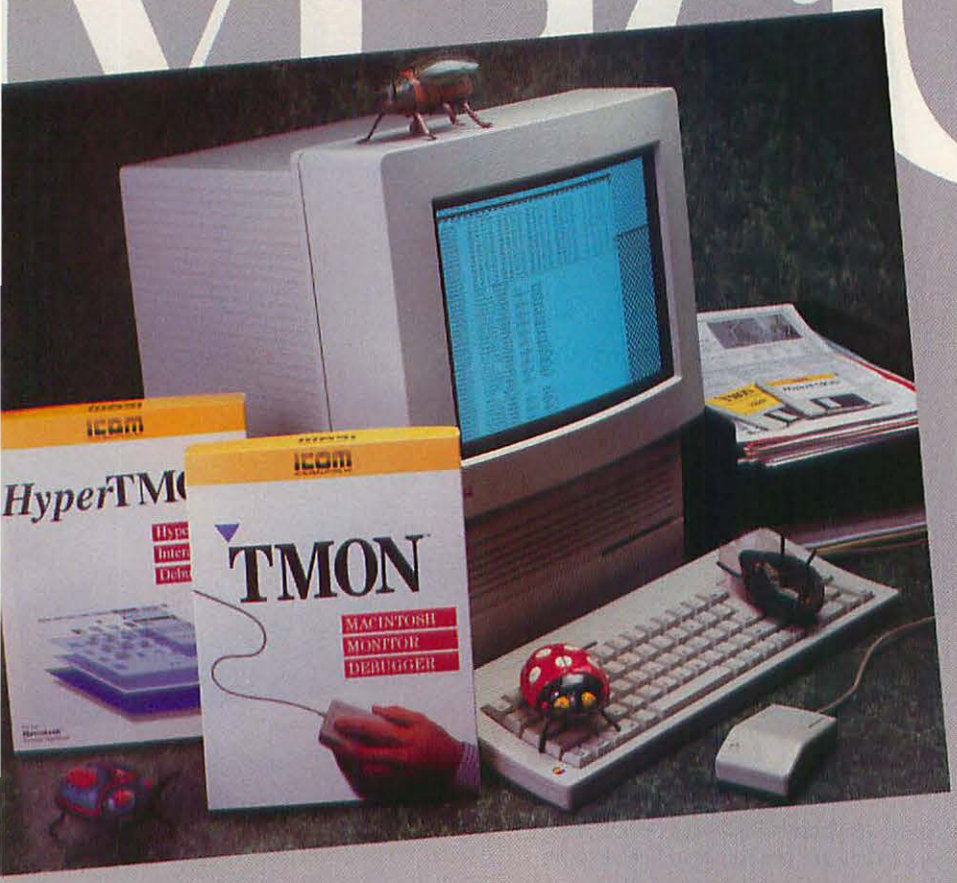
GDT Softworks ... 30 day MBG
6256 PrintLink Collection 3.01 **$59.**
6151 JetLink Express 1.02 **89.**
6255 Expressive Fonts. **119.**
6257 JetLink/Expressive Fonts Bundle **159.**



Call MacConnection to Order.

800-434-4444

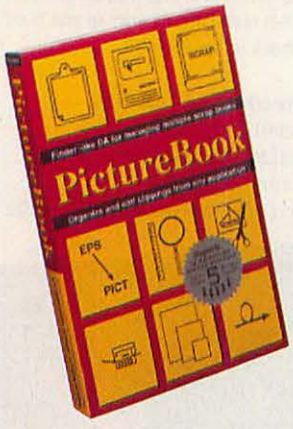
TOOLS OF THE TRADE



Take the Guesswork Out Of HyperTalk. Exclusively for HyperCard users, there's **HyperTMON**, which brings true interactive debugging to HyperTalk. You can single step through HyperTalk scripts one line at a time, including XFCN and XCMD extensions. Single step execution takes the guesswork out of debugging by pinpointing programming errors as they occur. It can help anyone write more advanced scripts and solve the mystery of existing scripts.

Debugging Made Simple. Reduce debugging time and increase productivity. **TMON** is a powerful, multi-window monitor/debugger that can drastically reduce debugging time. TMON has the ability to set breakpoints, display labels, and intercept system errors. Perfect for the novice as well as the experienced programmer. Received 5 Mice from *MacUser*.

ICOM Simulations
5681 HyperTMON 1.0 **$59.**
4085 TMON 2.8.2 **87.**



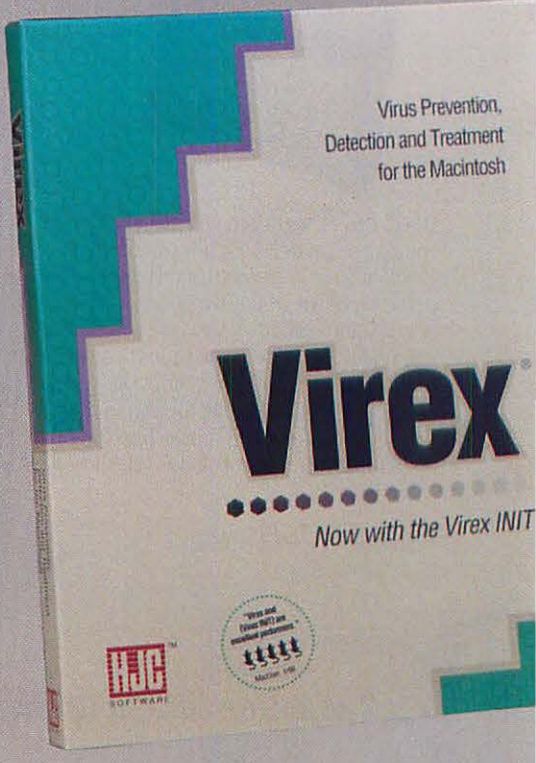
Scrap Worker. Put your clip-art in order with **PictureBook**, a DA that organizes and stores your art in multiple scrapbooks. Just name and annotate each piece, and cut and paste between windows. You can also print scrapbook catalogs or selected clips and scan by image, name, date, creator, type, or annotation. Plus a built-in editor lets you re-size any art, color or black and white. Reads PICT, MacPaint, and EPS files. 5 Mice *MacUser* rating.

Loop Software ... 30 day MBG
5442 PictureBook 3.2 **$39.**

No Sales Tax.

Sure Cure For Ailing Macs. How do you know if your Mac is just having a bad day, or if a virus is turning it into an electronic untouchable and possibly destroying valuable data? Just get **Virex**, click on diagnose, and find out. If so, the repair icon will heal your hard drive faster than a TV evangelist can shout, "You are healed!" Virex works on an individual file, a single disk or series of disks, or on a hard disk. And it can even *prevent* future virus infections. Registered users are notified of new anti-virus updates, and there's a toll-free help hotline. Find out why Virex got a 5 Mice rating (*MacUser* 1/90), and keep your Mac healthy.

HJC Software ... 30 Day MBG
4803 Virex *(latest version)*. **$52.**
5885 Virex *(10 Pak)*. **329.**

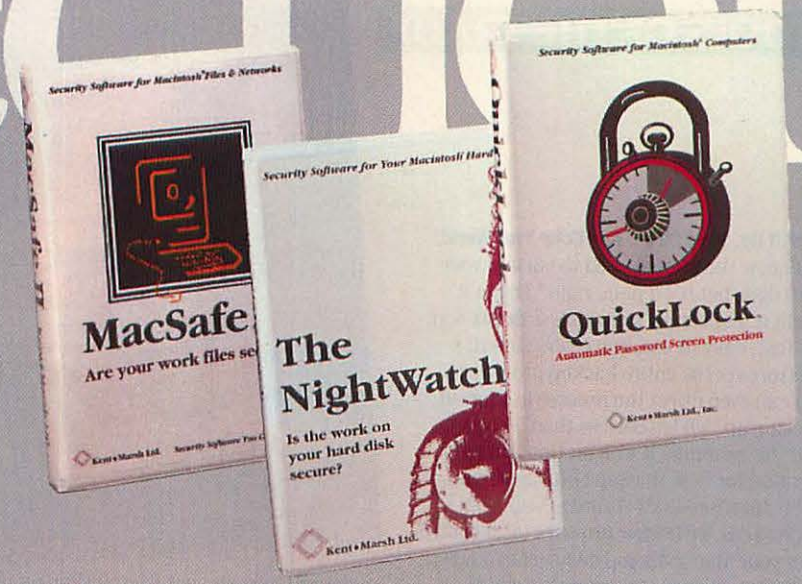




We Do Envelopes. Turn a troublesome task into a trivial one with **KiwiEnvelopes!**, a DA that lets you print perfect envelopes with a single click of the mouse—from any application. Choose any font size or style, include graphics, and even print bar codes to speed mail delivery. Kiwi remembers your return address and saves frequently used addresses for easy access. Plus, Kiwi does all the tough work so addresses are always correctly positioned for your printer—automatically. Retire your typewriter now!

Kiwi Software ... 60 day MBG
6267 KiwiEnvelopes! 3.0 **$35.**

Overnight Shipping $3.



Three Ways To Play It Safe. Looking to buy a little peace of mind? **The NightWatch** locks up your hard disk so only you can access it. Keep prying eyes away from your important work, day or night. Override is available (only to you) in case you forget your password. **QuickLock** displays a moving screen-saver image to prevent unwanted peeking *and* protect your display from phosphor burn-in. It allows background processing and you regain control instantly by entering your password. And **MacSafe II** offers total password security for your files (even on a network), with optional encryption as well. Password protect 3.5MB of data in just 3 seconds. Remember, it's always worth playing it safe.

Kent Marsh Ltd. ... 30 day MBG
2591 The NightWatch 1.03 **$86.**
5457 QuickLock 1.0. **56.**
6134 MacSafe II **107.**

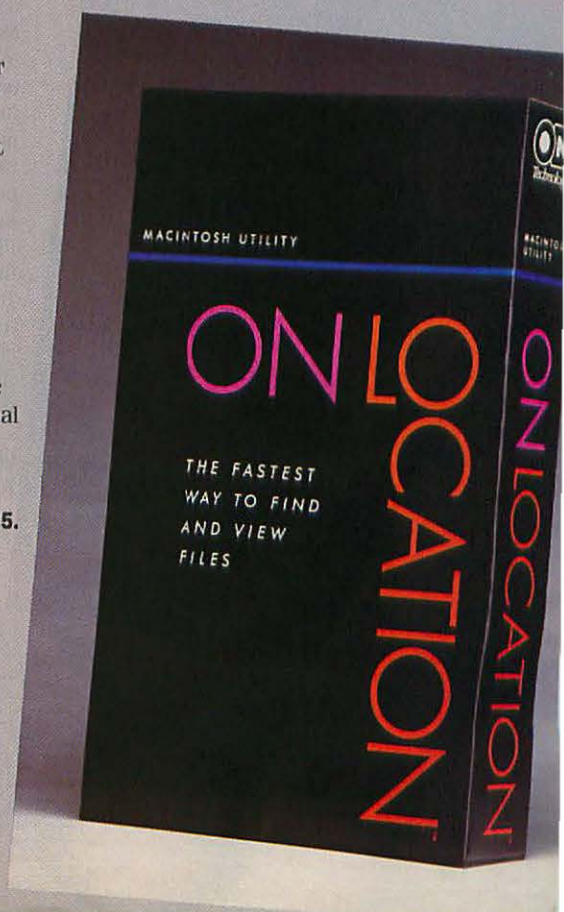


Generic Brain. Just Add Intelligence. HyperX is the HyperCard Expert System that you can teach to troubleshoot problems or provide advice when you're not around. So you can distribute your expertise anywhere there's a Mac. Applications include intelligent database interfaces, data analysis, computer-assisted instruction, troubleshooting, automation of complex procedures, and executive information systems. It includes powerful features for developing and delivering these intelligent applications. Written entirely in HyperTalk, it also provides an excellent hands-on way to learn expert systems.

Millenium Software ... 30 day MBG
6105 HyperX 3.0. **$65.**

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ON Technology ... 1 year MBG
6385 ON Location 1.0 **$75.**



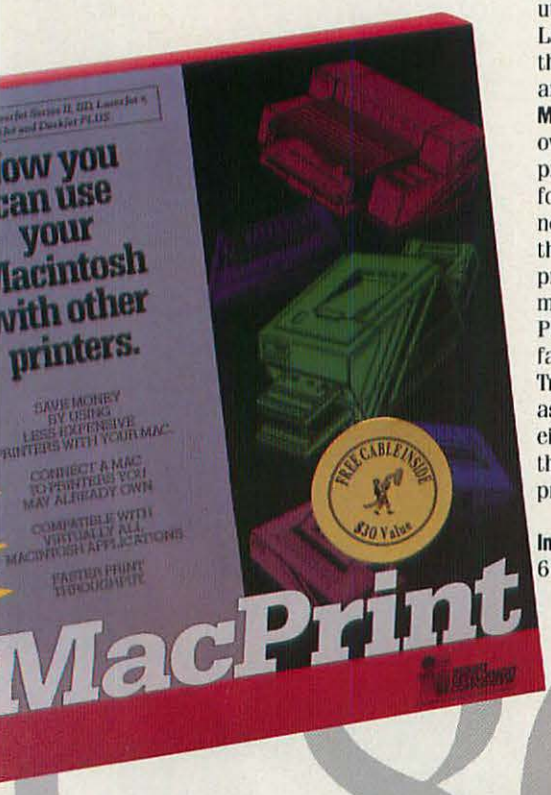
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Back It Up. Start Clean. And Color Your World. You know you're supposed to backup your hard disk, but it's a pain, right? Listen it's worth it. Especially the painless **Redux** way. It's fast, easy to use, and offers superb control over the entire backup procedure. You can even direct the process in English, backing up "all letters less than 5 days old," for example. It won an Honorable Mention for Best Backup Software in the 1989 *MacUser* Eddy Awards. Also from Microseeds, **INITPicker** provides total control over your Mac's startup documents (known as INITs). Change the order they run in, resolve incompatibilities, even protect against some viruses. For Mac II users, **Screen Gems** is a collection of five screen utilities that can change the way you look at things. *ColorDesk* replaces your gray desktop with any PICT file, *Dimmer* blanks your screen to prevent burn-in, and *SwitchARoo* toggles between any two user-defined screen modes.

Microseeds Pub. ... 60 day MBG

2913 Redux 1.6 **$49.**
4848 INITPicker 1.0 **25.**
4210 Screen Gems 1.0 **39.**



Now Macs Can Print On HPs. This handy little utility delivers WYSIWYG printing on any HP LaserJet, DeskJet or compatible (including the new LaserJet III), the Epson EPL 6000, and the Kodak/Diconix 150 Plus. Use **MacPrint** to share your PC's printer or switch over to a Mac without investing in a new printer. It displays your printer's resident fonts and font cartridges on screen (or, if necessary, creates a printable font based on the QuickDraw screen font), and lets you print text and graphics at your printer's maximum resolution—75, 150, or 300 dpi. Plus it comes with four Compugraphic font families: Courier, Times, Symbol, and Triumvirate in 12 sizes from 9 to 96 points, as well as a special cable that can be used in either your modem or printer port. This is the smart way to save thousands in new printer hardware.

Insight Development ... 30 day MBG

6171 MacPrint 1.2 **$95.**



The Ultimate C Environment. Symantec's **THINK C** version 4.0 takes programmers from idea to finished product quickly. THINK C's fully integrated environment features an extremely fast compiler, an ultra-fast linker, a multi-window text editor, and a powerful source-level debugger that all work together to reduce turnaround time. THINK C is the first C development environment on the Macintosh to support object-oriented programming (OOP). Plus, the THINK Class Library provides the building blocks to implement a standard Macintosh user interface, so programmers can quickly leverage the advantages of OOP.

Symantec ... 30 day MBG

3420 THINK C 4.0 **$168.**

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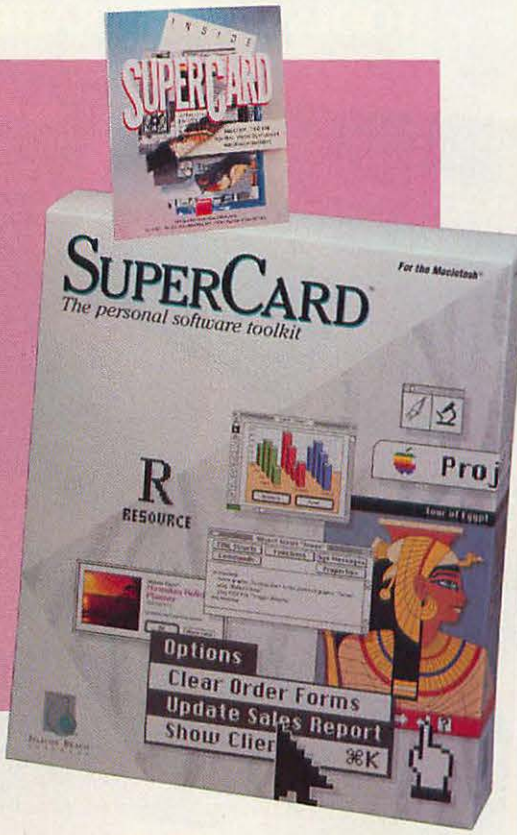


Just Say No. You need never again confront the dreaded "Application Not Found." **HandOff** lets you open any document from the Finder, even if the application is missing. Just assign "orphaned" documents to any compatible substitute application, either by creator (e.g., *MacWrite*) or filename extension (e.g., .TXT). And **HandOff II** adds the ability to assign documents by type (e.g., PICT) and gives you a convenient file launching pop-up menu that automatically changes color depth, and sound level to suit your application.

Software Innovations ... 30 day MBG
5869 HandOff 1.1 **$32.**
6647 HandOff II **52.**

More Frustrated Than Hyper? Maybe you need **SuperCard 1.5**. It creates true Mac-like applications and interactive documents with many powerful features HyperCard doesn't offer, including fully formatted text fields and a more powerful scripting language (SuperTalk). You can import current HyperCard stacks as a starting point, then add custom menus, color, high-res printing, and much more. Or, start from scratch to create your own custom applications—from a color drawing program to a multi-media executive information system—the possibilities are limitless. You supply the ideas, SuperTalk does the programming. And the new version (1.5) is *much* faster. Discover why *MacWEEK* (7/89) said "SuperCard gives you so much more than HyperCard that you owe it to yourself to see it." Winner of an Eddy Honorable Mention, *MacUser* (3/90).

Silicon Beach ... 60 day MBG
5100 SuperCard 1.5 **$189.**
6703 Inside SuperCard *(Microsoft Press)* . **17.**



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SuperMac Technology ... 60 day MBG
3382 SuperLaserSpool 2.02 **$87.**
3378 SuperLaserSpool *(5-Pack)* 2.0 . . . **289.**

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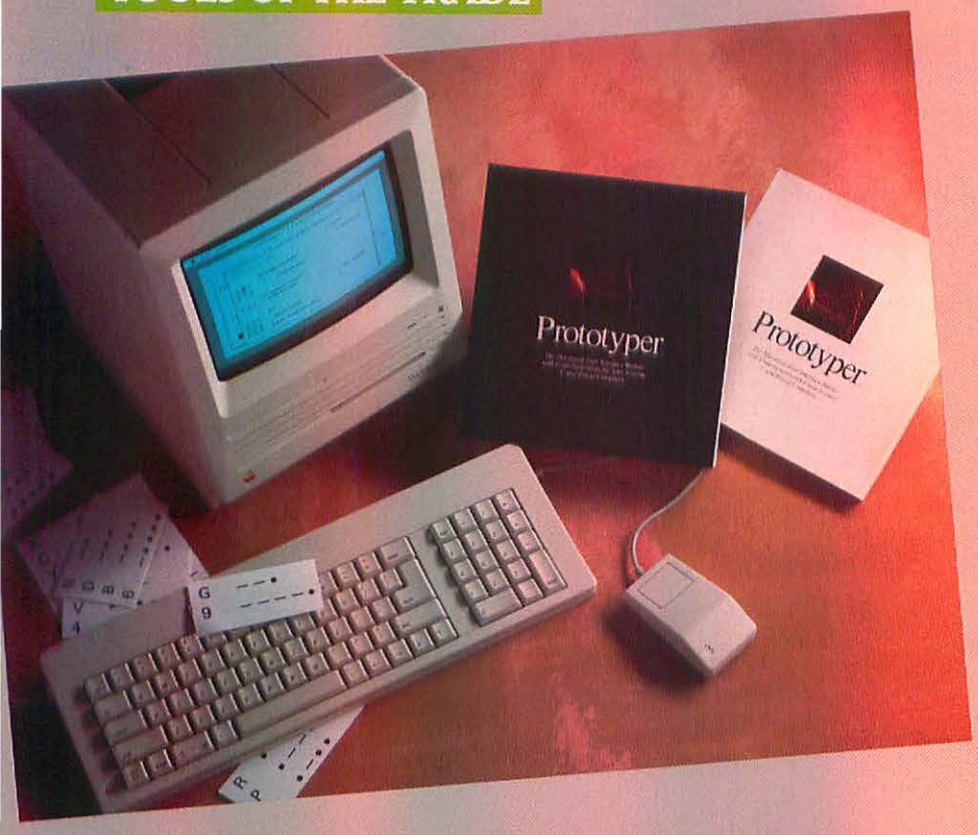
Symantec ... 30 day MBG
5176 Symantec Anti-Virus for Mac . . . **$68.**



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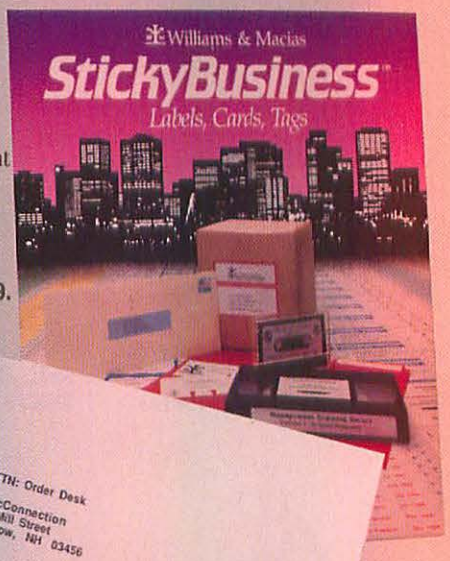
The Ultimate Prototyper, Simulator, And Code Generator. With **Prototyper**, you can program your interface as fast as you can draw it. As Dan Shafer, author of *HyperTalk Programming* put it, this completely integrated interface builder and code generator "makes the process of building a Mac application as easy as it's likely to get." Just click and drag items from a palette to give your program all the buttons, icons, pictures, text areas, check boxes, lists, rectangles, pop-up menus, bells and whistles you want. You can run simulations any time during the process. Then, once you're satisfied, Prototyper will *generate all the C or Pascal source code and resources automatically*. Your interface is complete. It literally couldn't be easier and it won an Honorable Mention for Best Programming Tool in *MacUser's* 1989 Eddy Awards.

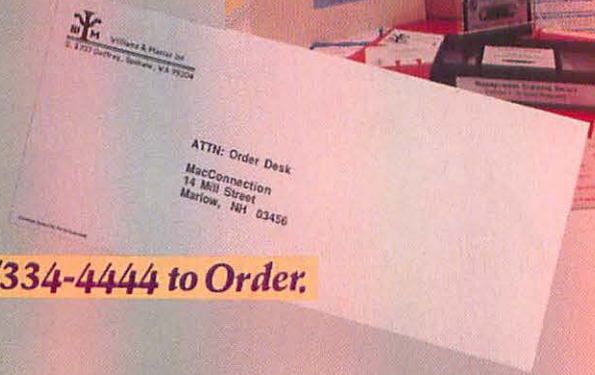
Now Software ... 30 day MBG
(formerly SmethersBarnes)
6739 Prototyper 2.1 **$185.**

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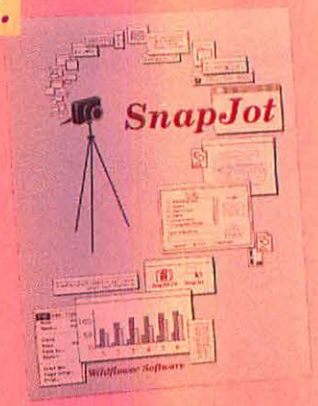
Williams & Macias ... 30 day MBG
4976 StickyBusiness 1.1 **$89.**

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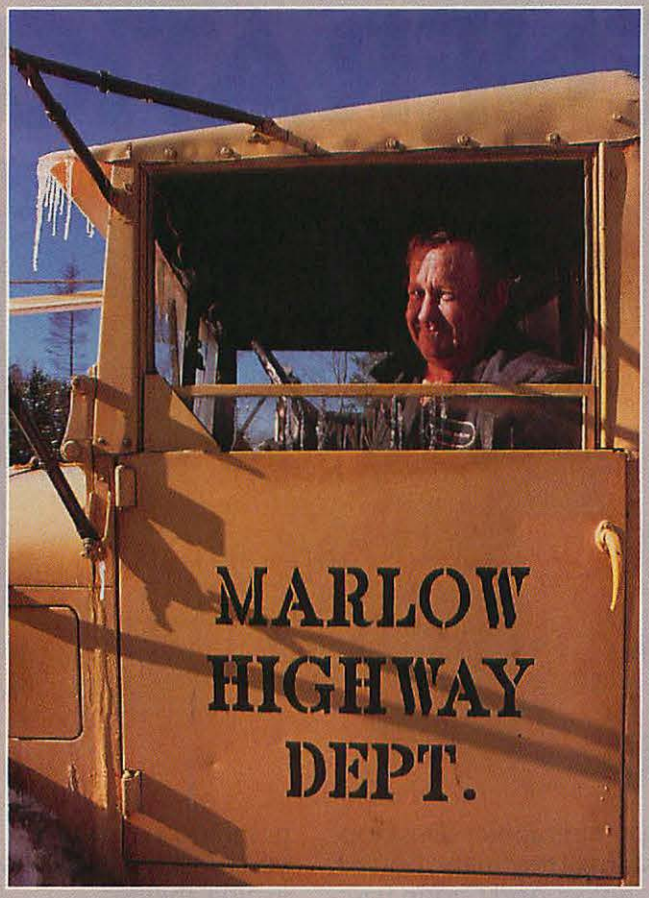


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Wildflower ... 30 day MBG
6512 SnapJot 2.0 **$32.**



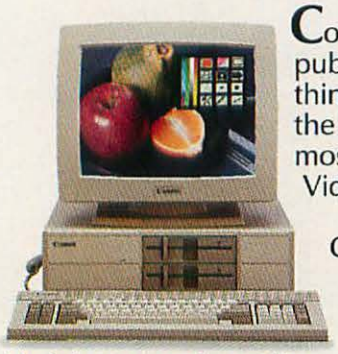
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Let's Play Monopoly

TOO MANY ONLINE SERVICES CAUSE CONFUSION AND INEFFICIENCY

BY STEVEN LEVY

The 1980s were great years for personal computing, with one pathetic, glaring exception: telecommunications. While most of us have happily exploited the powers of our computers for writing, publishing, number crunching, and information management, perhaps the most powerful ability of all—to communicate—has lagged. The symbol of this failure is the runaway popularity of the facsimile machine. It shouldn't have happened. Faxes are retrograde technology, far inferior to sending messages and files from one computer to another via modem. Fax machines are slow, they require their own telephone line, the copies they produce are often fuzzy (and sometimes incomprehensible), and worst of all, their transmissions can't be integrated easily into your own computer files for storage or editing. Faxes are anticomputer in a world geared toward computers. So why have they become a virtual necessity? Because people have rejected the idea that computers can be *the* vital tool for communicating. And why is that? Because it's so damn hard to use computers with modems.

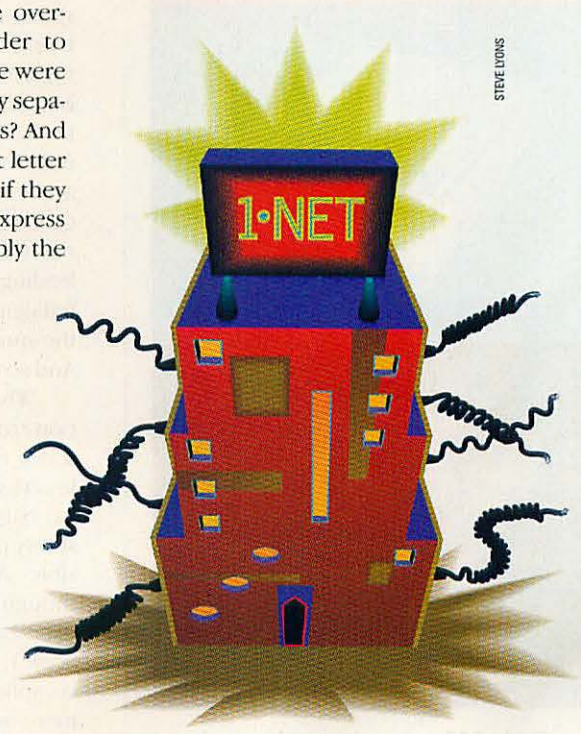
The problem is not in our software, but in our system—if you want to call it that. Our current system of computer communications is a mess bordering on a garbage heap. Instead of acknowledging that we are citizens of a global community, the system ropes us off into little tribes. Before I E-mail you a letter I better check which tribe you belong to: MCI Mail, CompuServe, ARPANet, The Well, America Online, Connect (now Business Information Network), AppleLink, or something else entirely. Each tribe has a different system of information transfer, each assigns you a different ID number, each has its own set of commands and variations of services. Can you imagine the chaos in the overnight mail industry if, in order to *receive* letters and packages, we were required to sign up with, and pay separate fees to, the various services? And you couldn't send an overnight letter to associates unless you knew if they were signed up with DHL or Express Mail or Federal Express? Probably the chaos wouldn't last very long because those firms would go out of business. People would not put up with that kind of confusion.

Baud to Be Wild

Of course, most people don't accept the current confusion in the online world. That's why the success of most broad-based online services, in comparison to their awesome potential, has been marginal at best. The approaches of, and target audiences for, these services are often somewhat different, but almost all of them offer communication among users on the system, a set of special interest groups where people with interests in common can share information and gossip, and often a variety of so-called value-added features. These range from instant stock quotes, to airline reservation systems, to online news and sports.

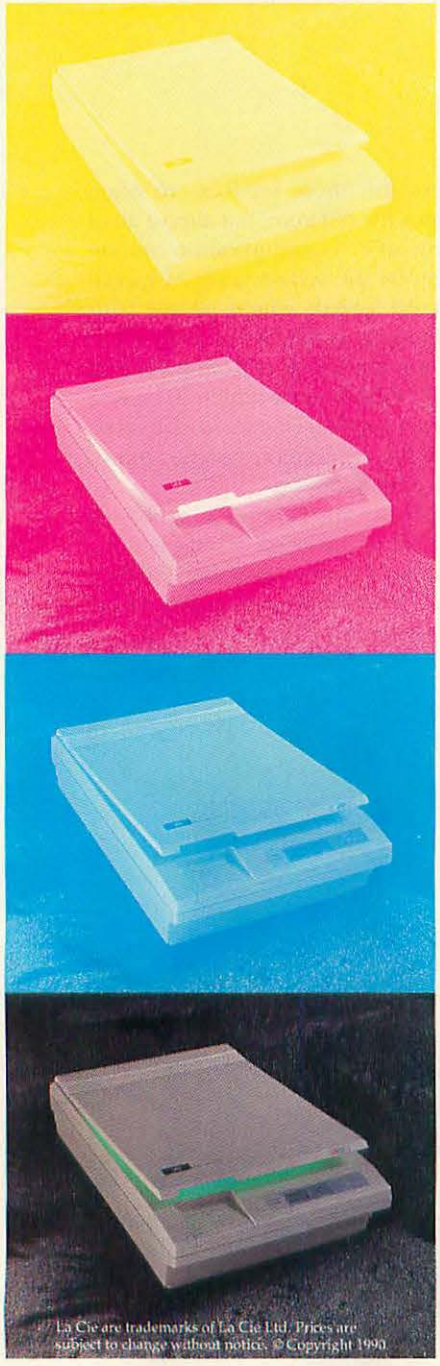
There are two huge problems with all of this. First of all, each system has its own interface, which is often horrendous and usually mired

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in the world of mainframe communications where it was assumed that only wireheads need apply. Recently this situation has improved; services like America Online and the Business Information Network have friendlier interfaces. The secret is that they provide a front end that looks like a plain old Macintosh program. Somewhere in the background your computer and the big mainframe host computer owned by the online service are swapping gibberish, but all you care about is clicking icons and opening windows on your Mac—and that's the way it should be. Unfortunately, doing things this way forces a trade-off on speed; Prodigy in particular is so slow that you sometimes think that running to the local 7-Eleven to get a newspaper is quicker than getting an electronic weather report.

The biggest problem, though, is the partial duplication of features. Almost every online service has something to recommend it; none have everything. Quite a few services have online airline guides and it's pretty common for networks to have CB radio–style meeting places where people can flirt shamelessly and swap inanities. But certain needs are met only in certain places. If you want pithy conferencing, you go to The Well, based in Sausalito, California. For sports news, you're probably best off trying the USA Today Hotline. If you want to read the latest version of Denise Caruso's "Inside Silicon Valley" column, you have to belong to the Business Information Network. The most active online Macintosh user group is on CompuServe. The real action in the news of computing, particularly in leading-edge subjects like artificial intelligence and fuzzy logic, occurs in the special interest groups on Usenet. And so on.

Who has the time, or the inclination, to join all of these? In the absence of software agents or so-called knowledge navigators to log on for us, bagging the goodies for our leisurely perusal, the task is nigh impossible. And it's getting worse—even though The Source has dried up (its user base turned over to CompuServe), things have only gotten more complicated in the past few years as more and more services have sprung up; while each one screams for our attention, the cacophony only guarantees chaos—and years of continued faxing.

A Modest Proposal

So let me humbly suggest a solution to the problem. Something that should have been done to begin with. I propose no less than a monopoly, a single service to which every computer user will belong. Call it OneNet. (Call it *anything*. Just get it going.) Initial membership will be free, and sign-up forms will be included with every modem sold, by every manufacturer. Each user will have one ID—ideally his or her real name, not some goofy handle—and one password. One mailbox. One monthly bill. No extra charges to use high-speed modems. No reason to use anything else.

Now, some people will undoubtedly have objections to this vision. "Aren't monopolies a bad idea?" they'll ask. Of course, monopolies often are. But sometimes they make perfect sense, particularly if there is diligent regulation. This is one of those cases. OneNet could be run as a public utility, overseen by a consumer board. The economies of scale would make it possible for this company to garner its profits at low costs to individual consumers. But most important, it would be consummately clear that we finally have a permanent common carrier; the decision to sign up would be a no-brainer.

In an instant, OneNet would transform the use of computer mail from a seminovelty to an invaluable addition to everyone's working life. Just like a U.S. Postal address, a single electronic mailbox would be a handy repository for all sorts of communications. But unlike hard-copy mail, you would have the advantages of computer mail. You could reply instantly. Or edit the input and integrate it into your own information base. Or send mail out to any of several mailing lists you've compiled. Imagine mailing out Christmas cards—perhaps with a digitized photo of your happy clan and a similarly digitized voice-recorded message—to a list of friends and associates that you've tended over the years. (An added advantage of this monop-

(continues)

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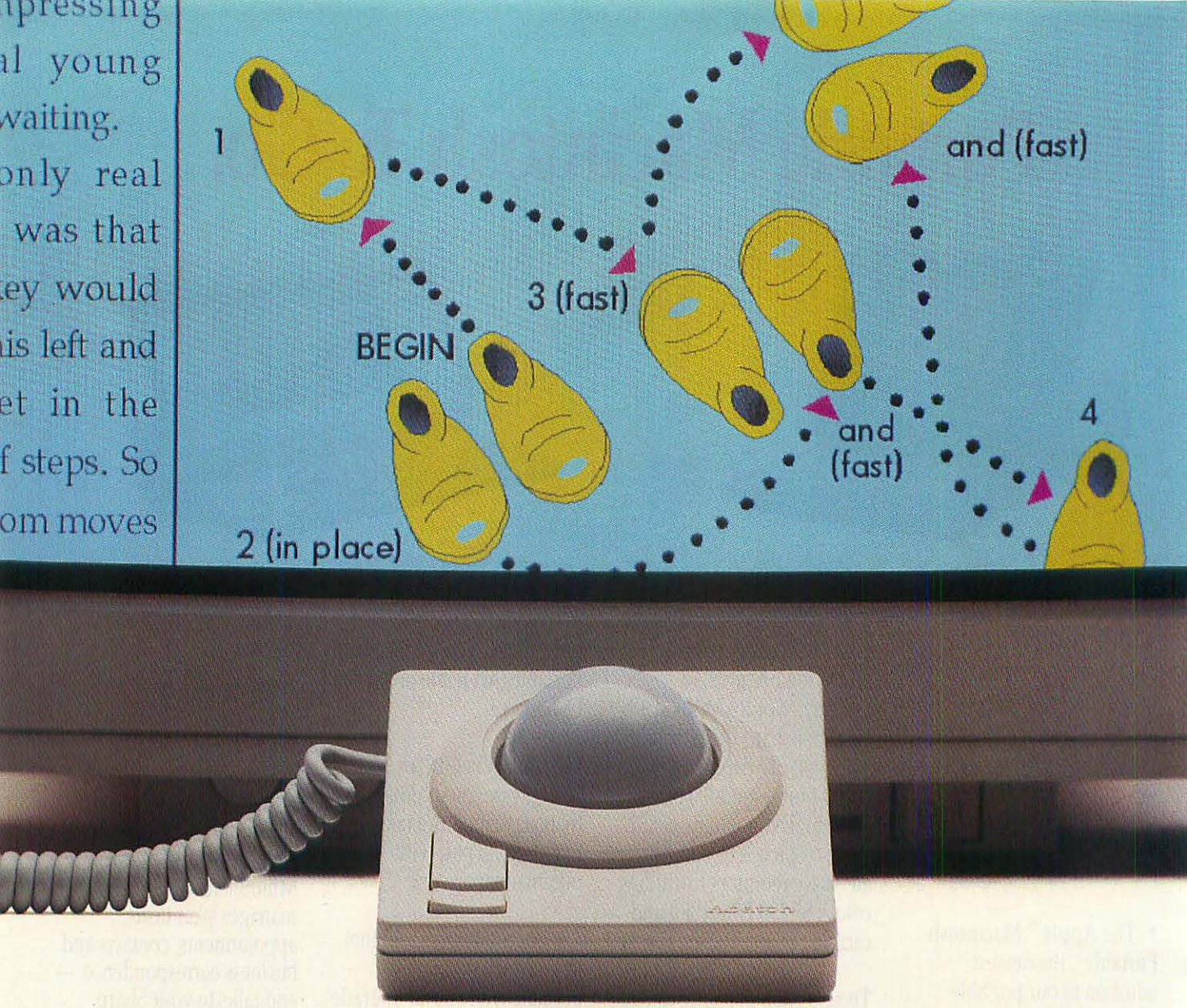
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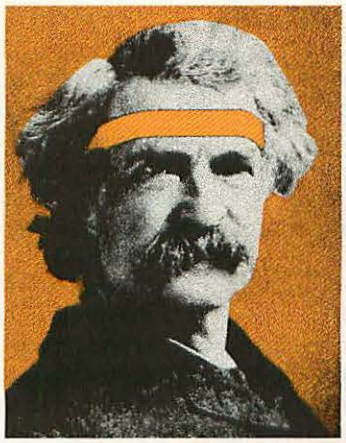
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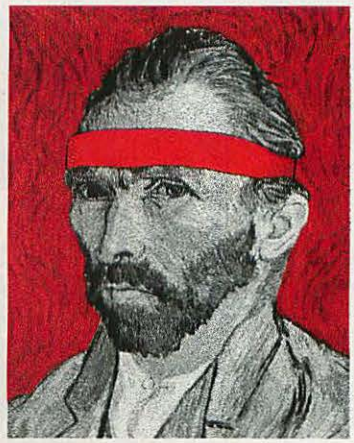
End users circle 294 on reader service card



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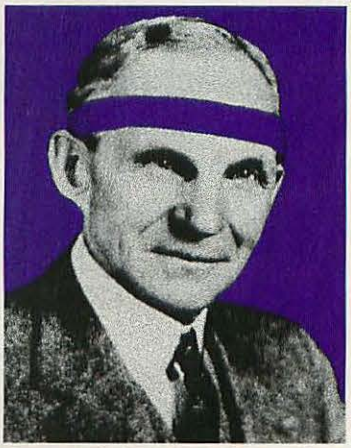
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If you find it hard to believe a program can do all this, visit you local software dealer today for a demo, or call us toll free at 1-800-482-4567 for a free, detailed brochure.

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Connect

Wang and Macintosh

VsCom/Macintosh—The industry standard Wang VS 2110 terminal emulation and file transfer software is now available for the Apple Macintosh, including complete support of the user interface standard.

VsCom connects locally and remotely through Wang VS ADC, EADC, MLTC or WACS communication ports.



Wang VS function keys are accessible through continuously displayed icons, the Macintosh extended keyboard, or regular keyboard aliases.

Powerful Script Command files can completely automate the Wang VS terminal access.

Two-way transfer of documents and files between the Wang VS and the Macintosh are easily accomplished with VsCom/Macintosh.

Document conversions include MacWrite, Microsoft Word, WordPerfect, and DCA Reviseable Format Text.

Wang documents supported include Wang Standard word processing and WP Plus.

An additional key feature is direct transfer of Macintosh documents and files in and out of Wang Office.

All the standard features of VsCom/PC are included.

Make the Wang connection your way!

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oly: better standards for moving files between computers. Since PC users, Mac users, UNIX users, and others would be swapping text, spreadsheets, graphics, voice, and eventually video files all the time, there would be a strong incentive to set up great protocols to do this.) Getting bills, while not a pleasure, would be relatively painless; once you had scanned them to see if they were accurate you could pay them with a few simple keystrokes—since you'd probably do your banking online. No paper generated, no filing problem.

Post Haste

True, you would receive a lot of mail. But handling the volume would be less of a problem. Since everybody would have these mailboxes, there would also be a powerful incentive to create fantastic front ends specifically geared to your computer. The interfaces for Mac users in particular would be friendly and effective. A box would show up on screen with the subject headers of the various letters, along with the names of the senders. You could go through the stack of mail at your leisure, banishing unwanted communications to the bottom of the pile.

What about junk mail? Unsolicited come-ons for commercial purposes would have to be labeled as such, and you could delete them with a keystroke. Better yet, when you set up your account you'd have a chance to specify whether or not you wanted to receive any. A possible alternative would be to force junk mailers to actually pay you to open up the file. Each time you opened up a pitch for low-cost floppy disks or Bermuda vacations, your account could be credited a few cents.

E-mail is only the most obvious benefit of such a benevolent monopoly. Every information service imaginable would be available, with new databases coming online all the time. These would not be owned by One-Net but would be independent operations. Users would pay separately for them, just as telephone users now pay for special phone services such as the weather reports or José Canseco's prerecorded opinions. But since the marketplace would be large and com-

(continues)

PCPC GOES DIRECT

PCPC, the leader in quality since the Macintosh and MacBottom were introduced, now brings you **Rock Bottom Pricing** for the 90's. You can purchase **professional grade equipment,** including hard drives, Trinitron® and gray scale monitors, graphics boards, tape drives and network backup software **at Factory Direct Prices** never before available. So call PCPC today!



JETSTREAM 8MM 2.5 GIGABYTE TAPE BACKUP
"The PCPC JETSTREAM is not only the fastest unit but also has excellent software that lets you back up all the hard discs on a network at any predetermined time." - MacWorld 12/89
Was *$5995
Factory Direct Price $4279

DATSTREAM 1.3 GIGABYTE TAPE BACKUP
Combining the legendary speed of JETSTREAM with the advanced capabilities of DAT this unit offers tremendous access speeds of less than 20 sec, 1.3 Gbytes of storage, write/edit capabilities, and Netstream Network Backup Software.
Was *$5995
Factory Direct Price $2879



NETSTREAM NETWORK BACKUP SOFTWARE
MacUser said it was the only software of its kind. MacWorld called it "excellent", MacWeek quoted users as saying it was "phenomenal". Unattended network backup of every hard drive for every zone on the network - even the server. No special hardware necessary.
Was *$1495
Factory Direct Price $499

All PCPC products are backed by an unconditional limited warranty and unlimited technical support.

*1989 SUGGESTED RETAIL PRICES



PCPC II / 8 BIT COLOR GRAPHICS SYSTEM
8 bit system with 19" Trinitron® monitor and tilt/swivel base. 1024 x 768. On board video RAM. Virtual screen Pan and Zoom software. "Highest overall on Image Quality. Number one in Price Performance." - MacWorld 5/89 - Was *$5995
Factory Direct Price $3658

PCPC II / 32 BIT COLOR SYSTEM
Combines low noise circuitry of the award winning 8 bit board with almost 800,000 colors on screen.Was *$8795
Factory Direct Price $4858

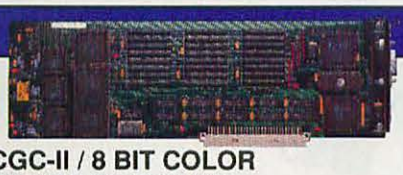
16" EXECUTIVE TRINITRON® GRAPHICS SYSTEM - Was *$4395
Factory Direct Price $2458



SHADOWGRAPH GRAY SCALE GRAPHICS MONITOR/SYSTEM
256 shades of gray, 5 mice! "Highest Price Performance leader." - MacUser 10/89
Nominated by MacUser for Best Graphics Product of the year - 1990. Includes tilt/swivel stand. Requires CGC/2 card. The ultimate for Desktop Publishing. Was *$2895
Factory Direct Price $979



MACBOTTOM HARD DRIVES
The Eddy Award Winning hard drive that revolutionized the industry. Quiet, reliable, fast! Own the latest version of the hard drive that started it all. Includes: utility software, Tryware, and rebate coupons!
Was *$1095 to $1895
Factory Direct Prices
21 MEG $439 42 MEG $579
32 MEG $499 84 MEG $789
105 MEG $1029



CGC-II / 8 BIT COLOR GRAPHICS BOARD
This is the board that makes the ShadowGraph and PCPC II number one in reviews. When you're ready for 32 bit color, this board can be upgraded. Was *$1895
Factory Direct Price $779

CGC-II / 32 BIT COLOR GRAPHICS BOARD
Combines low noise circuitry of the award winning 8 bit board with almost 800,000 simultaneous colors on screen. Was *$4995
Factory Direct Price $1979

HFS BACKUP 3.0
"HFS Backup has the most complete feature set ... seen in any program. Not only is HFS Backup powerful ... but it also works with 512 kE's. This is definitely a top class backup program." - MacUser 10/89. Was *$99
Factory Direct Price $49

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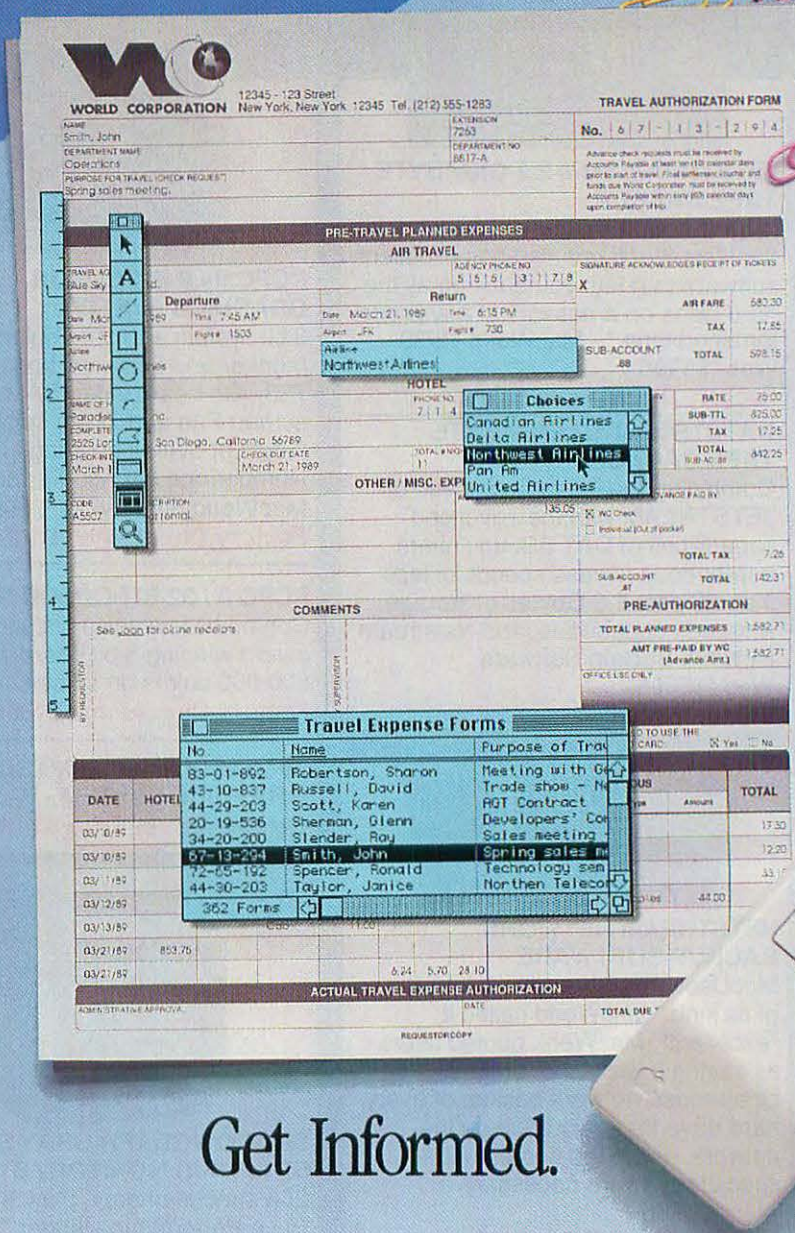
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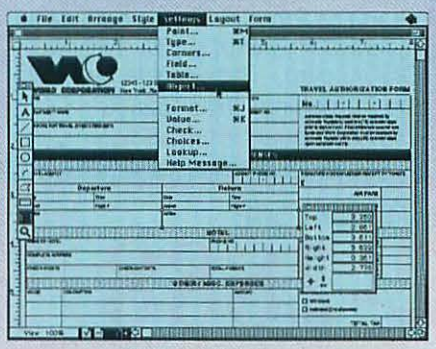


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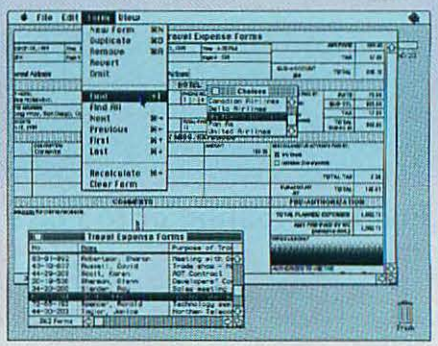
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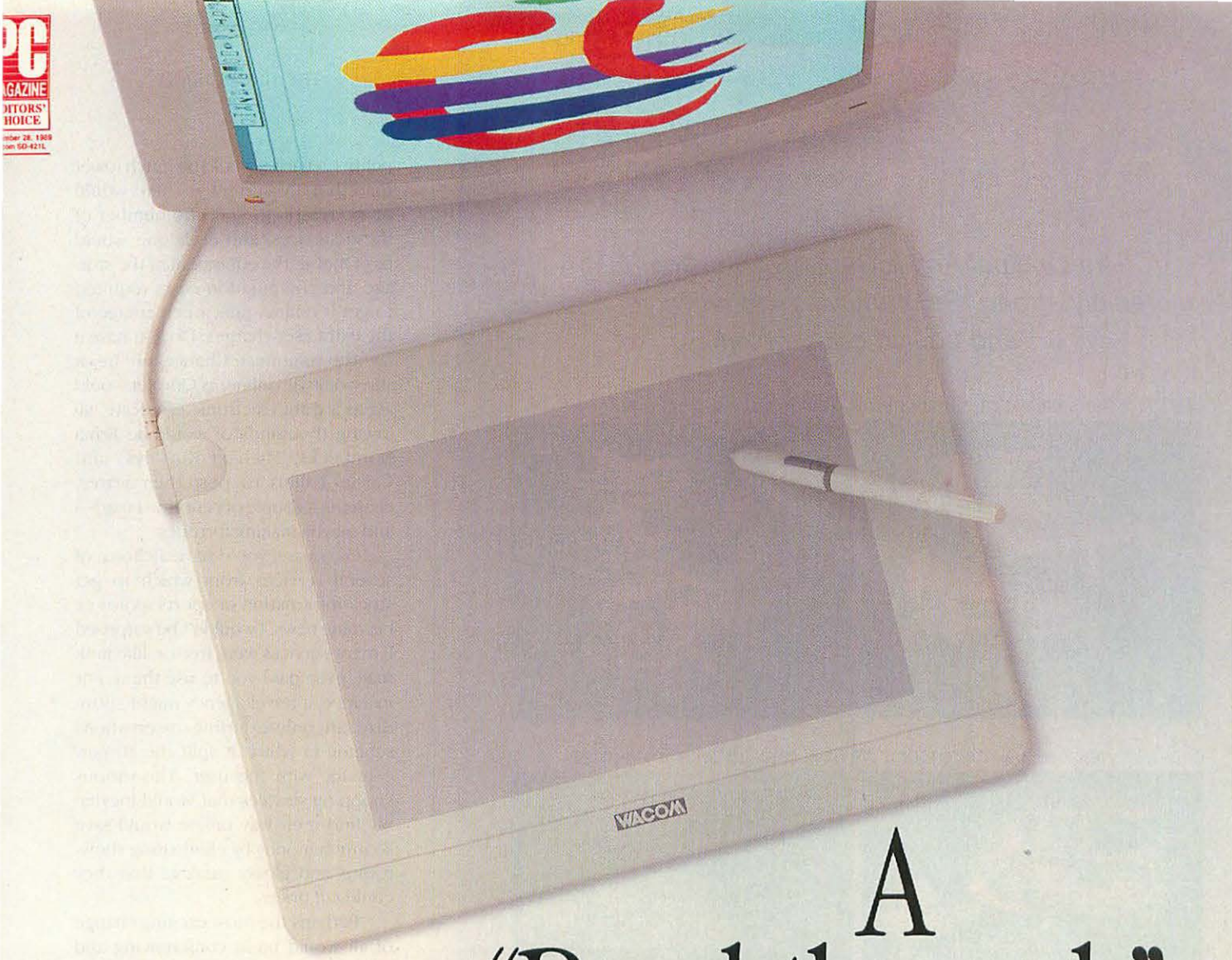
Informed Designer



Informed Manager

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Circle 297 on reader service card



A "Breakthrough"

Graphic Tool for Macintosh Artists

The Wacom cordless, pressure-sensitive stylus.

The Mac has always had great potential in graphic arts. But until now, no one has really provided a tool to unleash it. There has always been some form of mechanical trade-off imposed by input devices that inhibited artists from letting their imaginations flow naturally.

Now, Wacom introduces a totally "real" graphic tool, one that let's you interact with the Mac as intuitively as you would with a canvas. With Wacom's cordless, pressure-sensitive stylus your will is converted through manual pressure to line width, spray density, color change and other programmable effects. This allows you to create "real time" artistic images free of the artificiality and limitations of other input devices. And since the Wacom stylus has neither cable nor battery, it is also ultra-light and maintenance free.

Wacom, a leading name in computer graphics worldwide with proven man-machine interface technology, invites you to a new era in Macintosh graphics with a promise:

Once you experience it, you'll never look back.

Performance/Specifications: • Resolution: 1,270 lines/inch (0.02mm) • Accuracy: ±0.01 inch (±0.25mm) over entire active surface • Maximum reading speed: 205 points/second

Wacom SD-Series Digitizers: • A0 to A5, square or rectangular • Surface types: standard, magnetic, electrostatic, or transparent menu panel • Pointing devices: Pressure-sensitive, stroke-type or nonstroke-type cordless stylus, 4-button or 12-button cordless cursor

WACOM

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petitive, charges would be much lower than they are currently. There would be no reason to limit the number of these services, and each one would pay OneNet the equivalent of the storage and computation costs required to get it online, plus a percentage of the extra user charges. Do you have a favorite columnist? Chances are he or she would be online, as OneNet would act as a giant electronic syndicate, allowing thousands of would-be Erma Bombecks, Michael Kinsleys, and Calvin Trillins to post their wares, charging a couple of cents for a read—and maybe making fortunes.

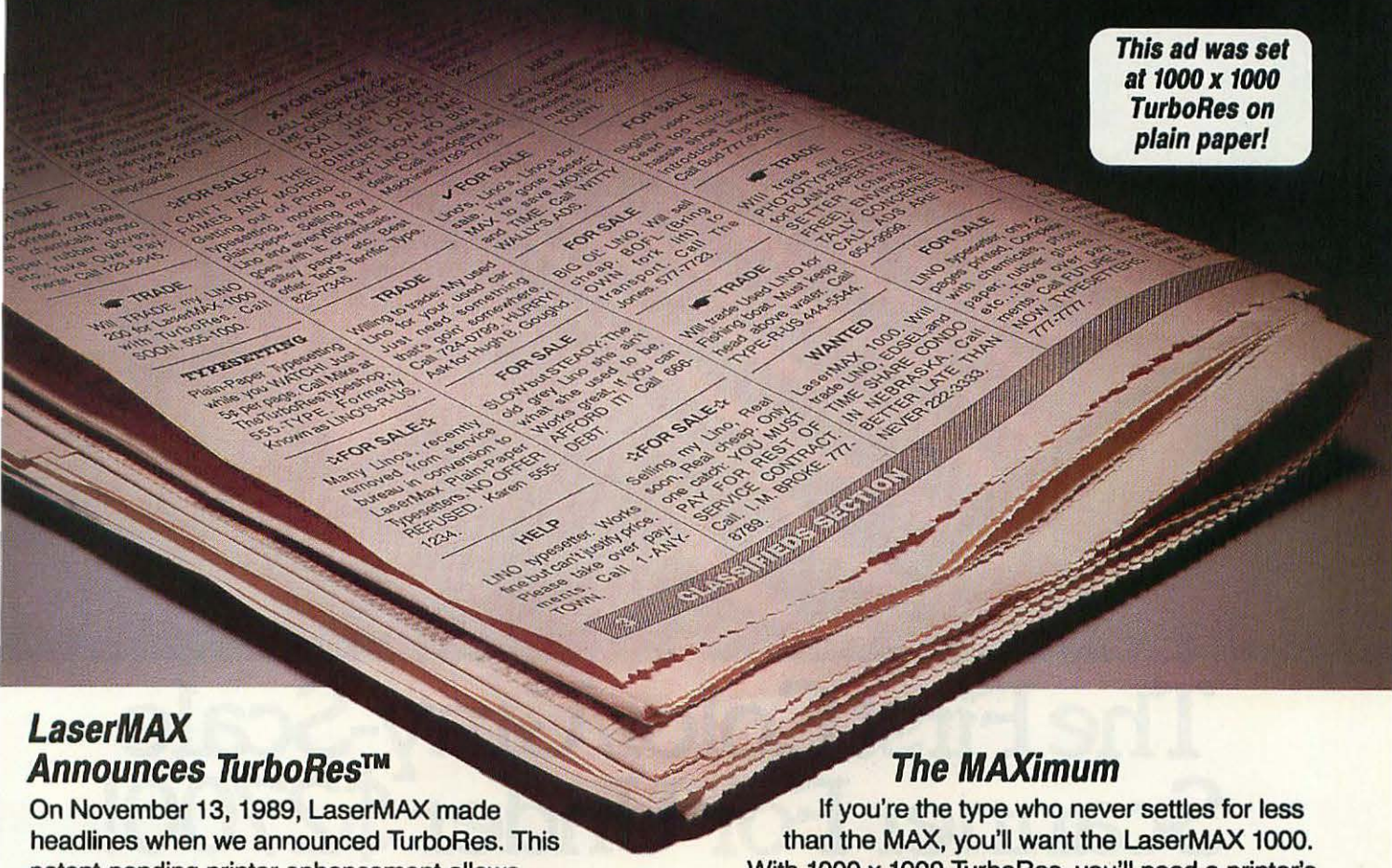
Of course, you'd have a choice of several services from which to get stock information or sports scores or headline news. I wouldn't be surprised if many services were free or, like junk mail, even paid you to use them. For instance, a travel agency might subsidize an online airline reservations scheme in which it split the 10 percent fee with the user. The various shopping services that would inevitably find their way online would save so much money by eliminating showrooms and glossy catalogs that they could cut prices.

Perhaps the most exciting change of all would be in conferencing and special interest groups. As they work now, these are basically an unedited series of comments; readers are forced to wade through thousands of unedited words in order to find a few nuggets of information or wisdom. Well, with OneNet those who are so inclined would still be able to read the raw comments, but the number of people participating in the forums would be large enough to support a cadre of deservedly high-paid editors who have a sense of what is really vital and fascinating. Essentially, they would boil down the comments into virtual magazines. They would also have the funds available to solicit and pay for commentary from experts or particularly felicitous writers.

(Incidentally, since OneNet would be a common carrier, like the telephone system, there would be no problem with censorship as we sometimes see on communications services. Of course, whoever posted a public message would be responsible for its

(continues)

When LaserMAX Made Headlines Lino Also Made the Paper.



LaserMAX Announces TurboRes™

On November 13, 1989, LaserMAX made headlines when we announced TurboRes. This patent-pending printer enhancement allows LaserMAX to *dramatically* increase laser printer resolution. Our proprietary new technology lets us control the size of the pixels on the printed page, eliminating the coarse steps between pixels (which ordinarily show up as jagged edges on type printed at low, 300-dpi resolution). Instead, TurboRes creates plain-paper typesetting that rivals phototypesetting–so you won't need to go to Lino any more.



TurboRes enhances the capabilities of all LaserMAX products, which come complete with 35 standard typefaces, and work with the Macintosh II, IIx, IIcx, IIci, and beyond.

Goodbye NTX, Hello NTQ

If you already own an Apple LaserWriter, you're in luck. With a LaserMAX MX6 controller you can boost your resolution from 300 dpi all the way up to 800 x 800 TurboRes for **N**ear **T**ypeset **Q**uality.

The MAXimum

If you're the type who never settles for less than the MAX, you'll want the LaserMAX 1000. With 1000 x 1000 TurboRes, you'll need a printer's loupe to prove that the output isn't traditional typesetting. But unlike phototypesetting, the LaserMAX 1000 is:

- Low-cost (only pennies per page),
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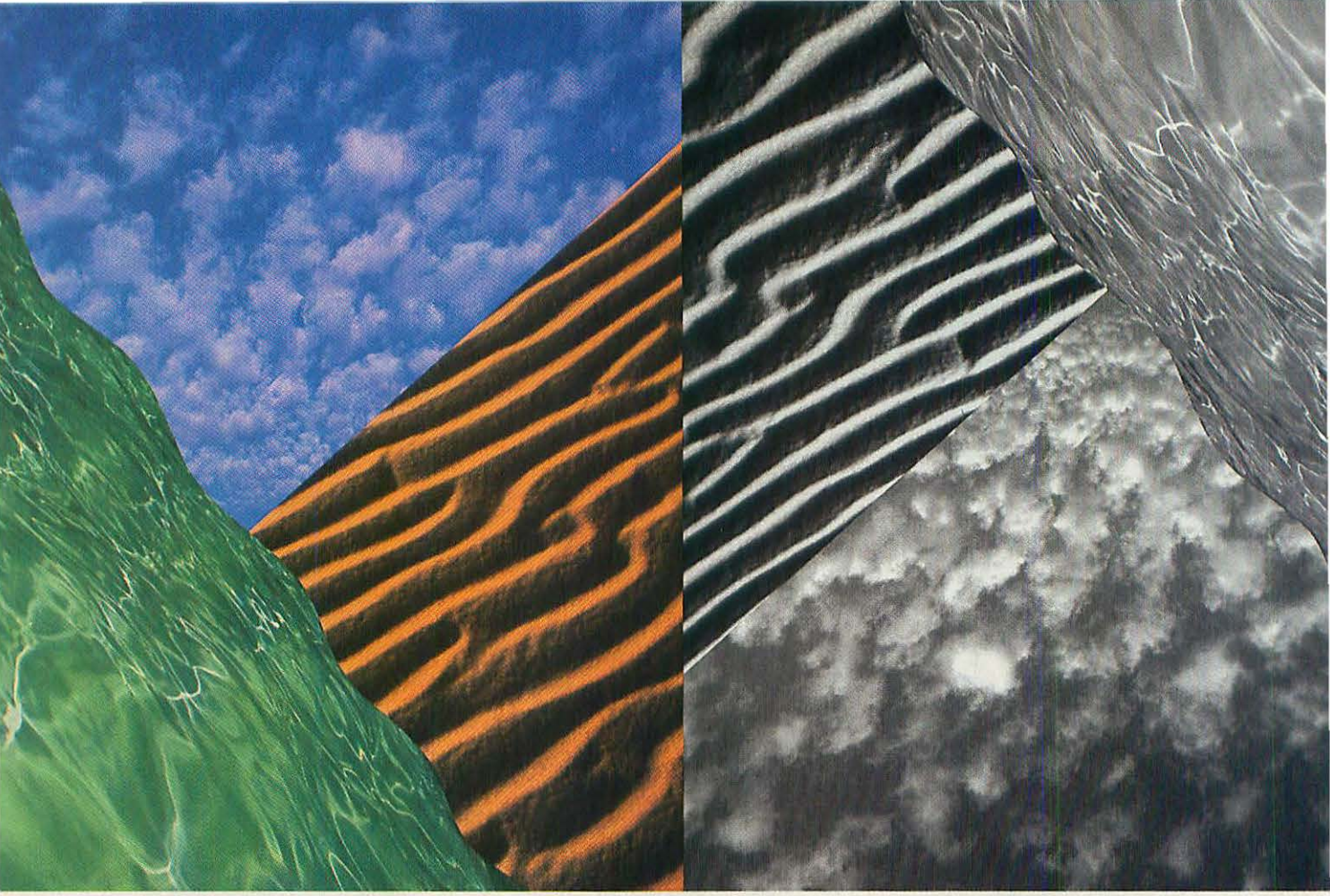
To learn more about the magic of LaserMAX with TurboRes, call us now at **(612) 944-9696**. We'll send you a page of actual output so you can see just how good TurboRes really is. Then you can decide for yourself which you'd rather have: the technology that lets you make tomorrow's headlines, or yesterday's classifieds.

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The First Color/Gray-Scale Scanner For Under $2700!



Microtek presents the MSF-300Z. The one scanner that can do it all: color, gray-scale, drawings and text. All for a price that until now, could barely buy you gray-scale capabilities.

Hard to believe, but it's true. You can scan vivid color images into your computer for desktop publishing, presentation graphics or pre-press work. A full 16.8 million colors at a time.

If you don't have a color application yet, this unique scanner captures gray-scale as well as black and white. So you can start working today.

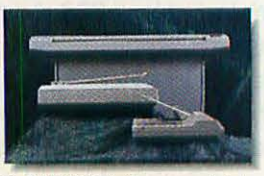
Images can be scanned in 256 gray-scale mode and then retouched, scaled or rotated. And printed on a laser printer or phototypesetter with outstanding results.

Charts and drawings are quickly scanned in single bit-per-pixel mode then imported into your favorite publishing or word processing program. You can even bring words into your computer without retyping by adding OCR software.

The Microtek Color/Gray scanner also comes with sophisticated color, gray-scale and black and white image editing software. Making it an even more outstanding value.

24 BIT COLOR
8 BIT 256 GRAY LEVELS

If you need a scanner for your IBM PC, PS/2, or Macintosh, you need Microtek's MSF-300Z Color/Gray scanner. Call (800) 654-4160 or in California (213) 321-2121 today to find your nearest Microtek dealer. After all, at this price, you can hardly afford not to.

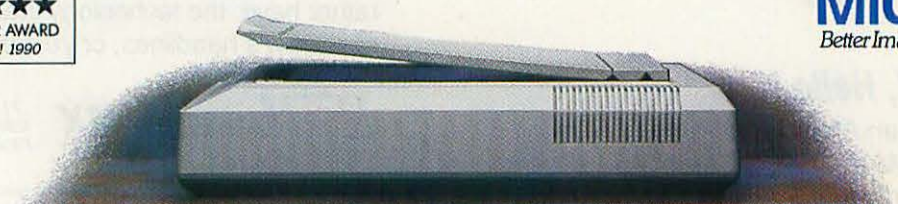


The MSF-300Z Color/Gray scanner is just one member of a whole family of innovative scanners available from Microtek.

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content, subject only to whatever compromises of the First Amendment the courts are offering these days.)

Eventually, there will be so much great stuff posted on this huge net that I can envision a day where independent editors—electronic William Shawns and Eric Utnes—will scan the stuff and put together pungent digests of information, based on their own instincts. Interested readers will learn which editors have tastes they can appreciate and which ones have instincts honed to what is really important, and they will subscribe to the ad hoc virtual news services compiled by those editors. We could see a renaissance of ideas spurred by superstar editors and online cult favorites whose ideas will spread like viruses on the system.

Do the Right Thing

I know, I know. This is beginning to sound like an Isaac Asimov article from 1960. (Just imagine having a computer connected to the telephone! Yes! In your house! And you get your mail from it!) But really, what I'm describing is not a radical change. The difference is that the motley aggregations of online services we have now just don't have the wherewithal to turn the corner. Instead of arguing about which comes first, the chicken or the egg, let's get us a chicken! From there everything else will follow—great software interfaces, great services, wonderful new forms of literature. Maybe we'll even see a decent stab at hypermedia, since that particular vision requires a hitherto unobtainable level of connectedness.

Best of all, this plan would kill the fax machine. I have an idea for that, too. Let those loathsome appliances be replaced by what seems to be an inevitable computer peripheral, a combination laser printer–scanner–copier. Okay, maybe this isn't such an original thought, but I haven't seen one yet. Are you listening, Apple? Maybe I should send out some E-mail on this.

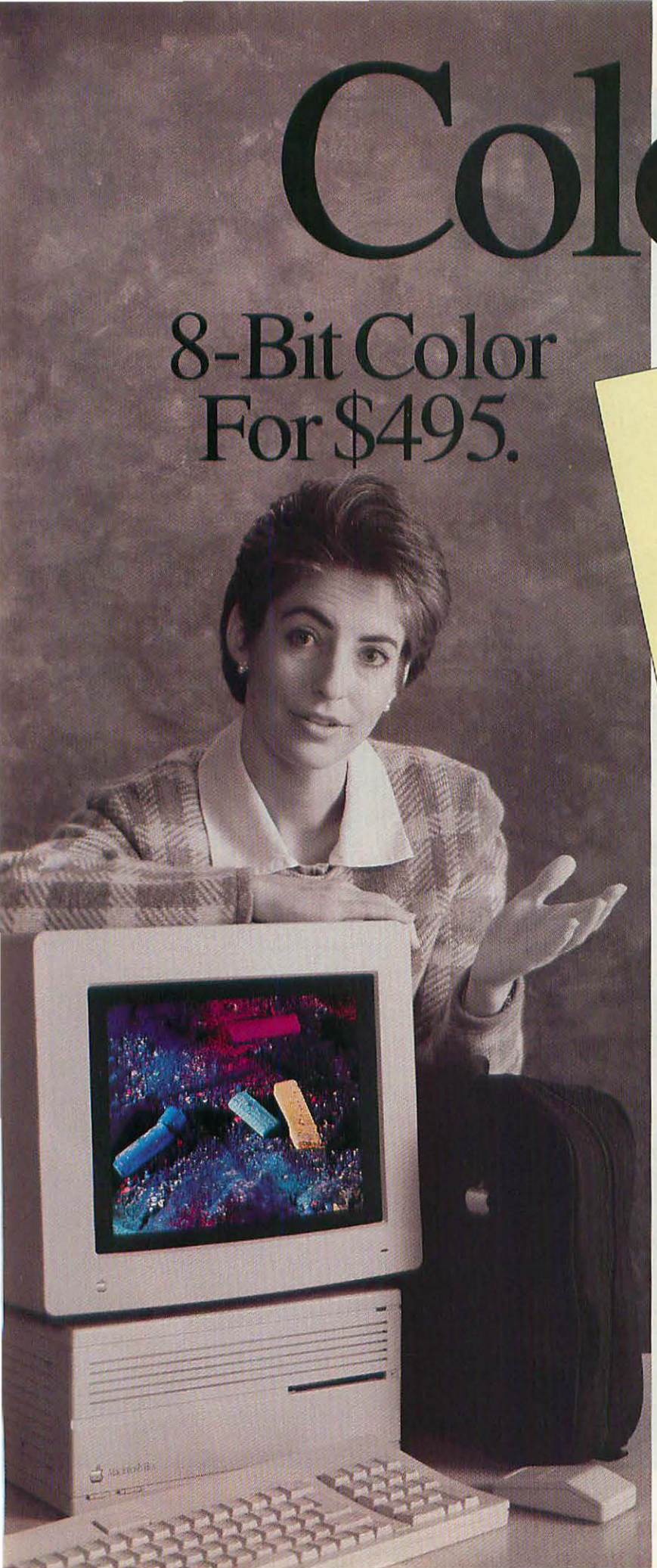
Steven Levy is a Macworld *columnist and the author of* The Unicorn's Secret: Murder in the Age of Aquarius *(NAL, 1989).*



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Colorful

8-Bit Color For $495.



"Let's face it. The world is not black and white. And why should it be when RasterOps can bring color to the Macintosh for less than $500."

Finally, you can display 8-bit color on any Macintosh-compatible 640 x 480 monitor . . . without taking out a bank loan.

It's called the RasterOps ColorBoard 208.

And it ushers your Macintosh into a world of brilliant color. Depending on your needs, the ColorBoard 208 allows you to select color modes of 2, 4, 16 and 256 colors.



What's more, if you ever need 24-bit color, RasterOps protects your investment. By merely adding RasterOps' user-installable memory modules to the ColorBoard 208's existing sockets, you can upgrade to the ColorBoard 264. And in a matter of minutes you'll be working with 24-bit color.

Make A Colorful Impact!

Send us this card and we'll send you our product brochure and the name of your local RasterOps Authorized Dealer.

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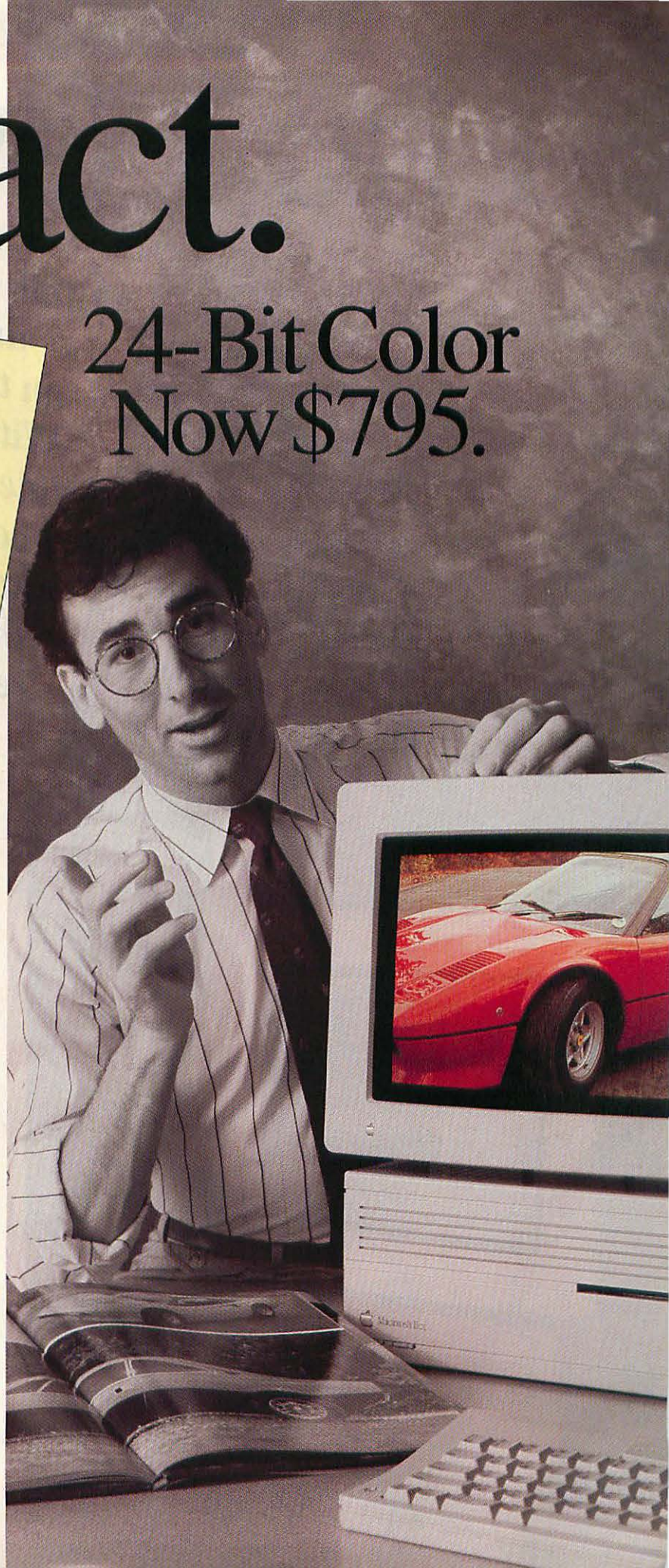
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Santa Clara, California 95051-9877



Impact.

24-Bit Color Now $795.

"I need 24-bit color that screams. RasterOps broke technology barriers to deliver the world's most advanced True Color board. It's great!"



Simply stated, the ColorBoard 264 has revolutionized the state of 24-bit color on the Macintosh. In addition to its unbeatable price, the ColorBoard 264 represents the most advanced VLSI design ever offered. It's the fastest read/write cycle possible on a Macintosh, thanks to a video interface that provides 300 nanosecond cycles.

And the ColorBoard 264 offers dynamic support for your photorealistic images. You can instantly see the effects of the changes you make to your color image.

Now that you can afford True Color, use your Macintosh to make a colorful impact!

RasterOps®

"We're changing the way people look at computers."™

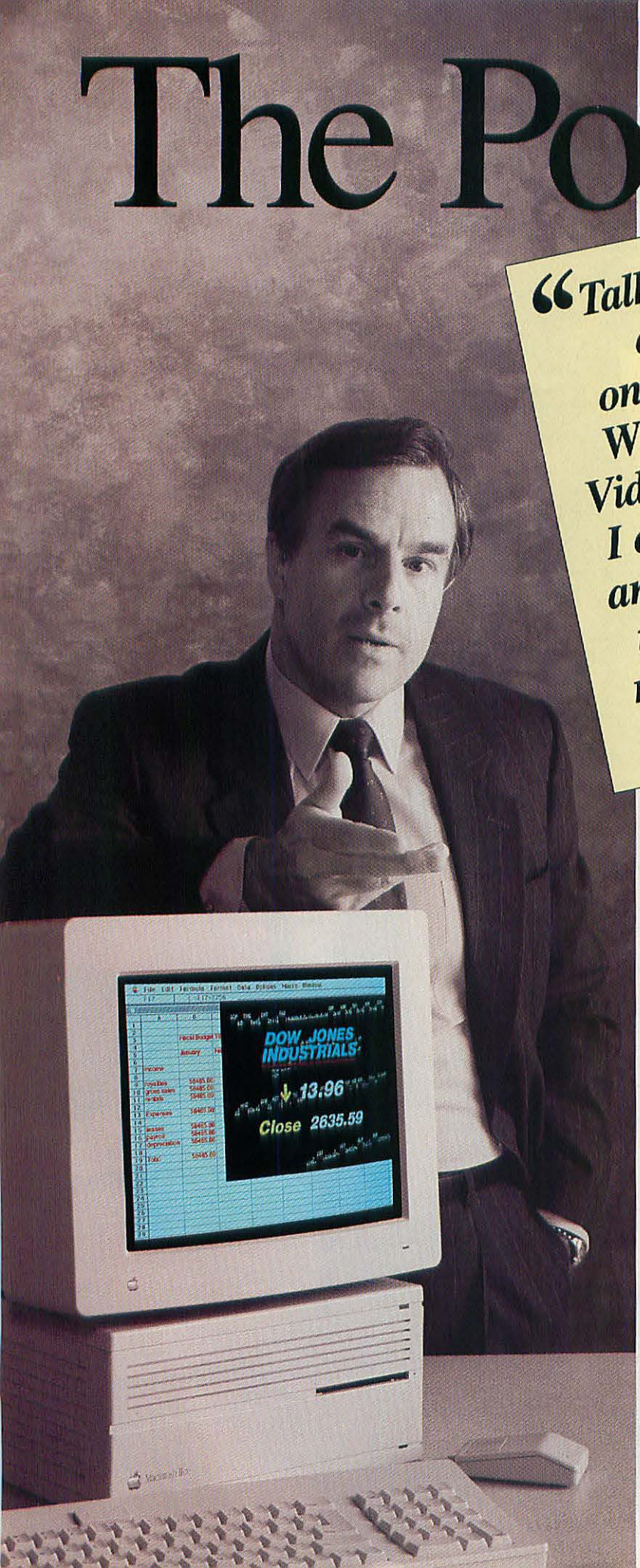
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Call RasterOps HOTLINE 1-800-468-7600 for more information.

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The Power O



"Talk about gaining an advantage on the competition. With the RasterOps Video ColorBoard 364, I can produce a stock analysis and check out the latest Wall Street report simultaneously on my Macintosh."

The promise of multimedia just arrived. And it's from RasterOps.

Introducing the Video Colorboard 364, a single NuBus board that brings the world of full-motion video to your Macintosh.

In short, the Video Colorboard 364 is both a frame grabber and a display board, meaning you can selectively watch live TV or video from any NTSC or S-Video source on a Macintosh screen and capture any image.

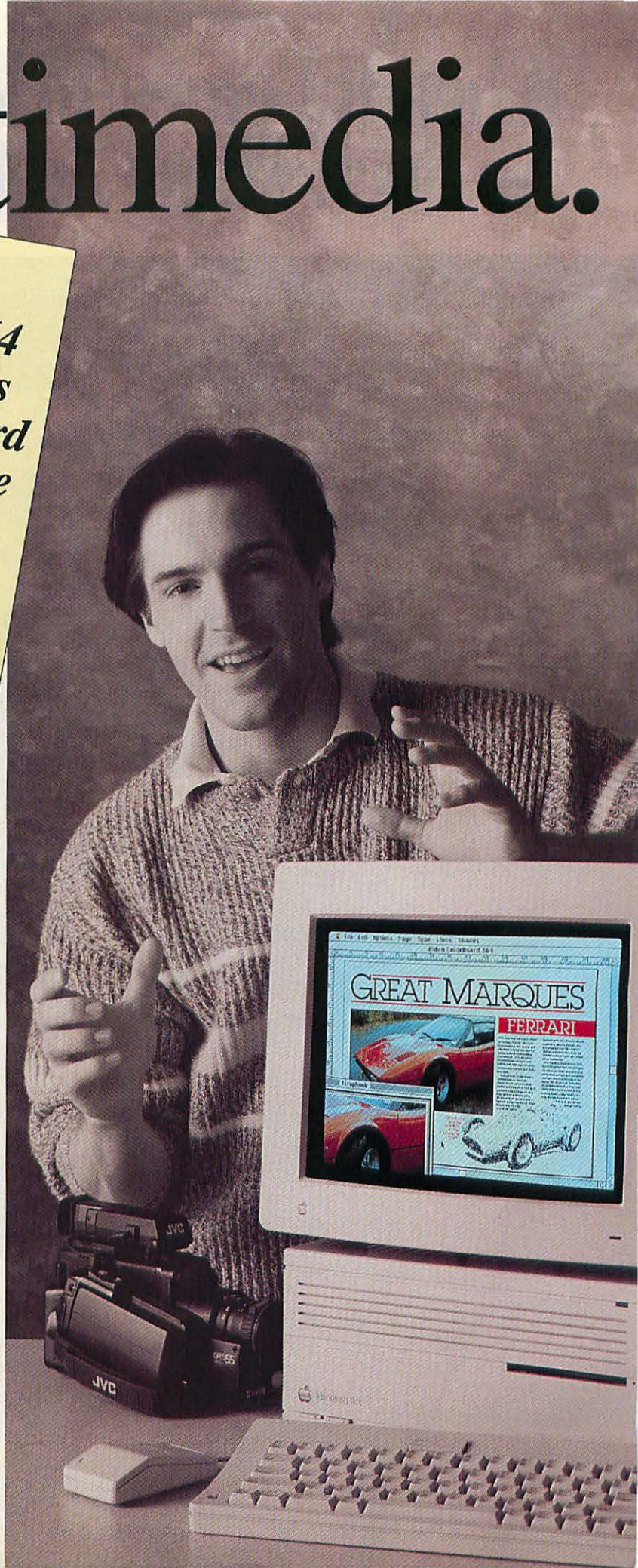
Even more amazing, you can run an application program and show video on your Macintosh at the same time . . . without depending on MultiFinder.

If this sounds like a technological breakthrough, you're right. In fact, RasterOps has a patent pending on the circuitry that makes it possible.

Once the video appears on the screen, you can change the channel, brightness, contrast, or sound directly from your Macintosh, thanks to the RasterOps Video Tuner. This companion product also provides a speaker and headphone jack. And a second companion product, the RasterOps Video Expander, enables you to output Macintosh-resident graphics to a video recorder in true 24-bit color.

f Multimedia.

"The RasterOps Video ColorBoard 364 is a graphic designer's dream. This single board in my Macintosh lets me capture a 24-bit color image from a video source, then transfer the image into a desktop publishing package."



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Gambling on Jasmine

WILL ITS SERVICE IMPROVE, OR WILL CUSTOMERS LOSE THEIR SHIRTS?

BY DEBORAH BRANSCUM

Since last summer *Macworld* has received complaints about Jasmine Technologies, complaints the company usually resolved. But the trickle became a flood in the late fall and winter when *Macworld* received some 25 complaints, far more than about any other company. Angry readers told similar horror stories: of broken drives held hostage for months; of credit cards charged for product orders that never arrived, but were always "two weeks" away from delivery; of well-meaning but powerless customer service reps; of long-distance telephone calls that disappeared into an expensive, time-consuming holding pattern; of messages that were never returned; of refunds that were denied or slow in coming.



Financial and management troubles at Jasmine Technologies appear to have crippled the company's customer service for a year. Jasmine counters by saying that most of its customers are satisfied. Company officials claim they're responding to problems as fast as they can and are fighting for financing that they say will resolve customer-support issues once and for all.

Paul Ludden is no stranger to support problems. The University of Wisconsin professor ordered a 20MB hard disk from Jasmine on December 4, 1989. The purchase was charged to his MasterCard account the next day and the drive was supposed to arrive within three to four weeks. According to Ludden's records, on January 9 he spoke to a Jasmine employee who told him the drive would arrive within 5 to 7 days. On January 17 Ludden talked to another representative who explained that the company had discontinued its 20MB models, but would give him a 40MB drive for the same price in 10 to 15 days. Ludden left a telephone message on February 6; on February 20 he received a postcard saying his drive would be shipped the week of February 25. "Let me point out this is my kid's Christmas present, which he has still not received," said Ludden.

The same day Ludden received his postcard I called Jasmine to check on his order. A customer service rep told me Ludden's drive was scheduled for shipment the week of March 18—not February 25. It's anybody's guess when the drive will actually arrive.

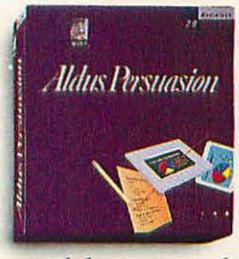
If a product hasn't been shipped within 30 business days, Jasmine is bound by law to notify customers in writing that they have the option to cancel the order. So far Ludden hasn't received that notification. (At least he has a choice. Those waiting for repairs aren't so fortunate.) Ludden's credit card account was charged when he placed the order (which the salesperson didn't bother to tell him). Some customers are both surprised and angry that Jasmine has their money long before the drive arrives. Other Jasmine customers said the company encourages them to buy upgrades to larger machines instead of refunding their money or giving them free upgrades when repairs aren't possible.

Barry Schuler, executive vice president of Jasmine, insisted that the company observes all FTC regulations. Company president Patrick Silvagnia assured me that Jasmine honors requests not to bill a credit card before shipment. And although several people I spoke to said they were never given the option to cancel their orders, Jasmine showed me a postcard the company said it uses to give customers that option when they are notified of late shipments.

The officials did acknowledge customer service problems. "This time last year, Jasmine's product line was in a shambles because a contract with its single source [of drives] had ended and the management team changed," said Schuler. "And we had to spend the entire year getting everything in shape."

Jasmine products have won the *Macworld* World-Class Award and favorable reviews here and elsewhere. The drives themselves have not been the issue. As one reader put it, "Jasmine is real-world proof that a long warranty is worthless if it takes two months to get warranty service." Schuler said the company is taking

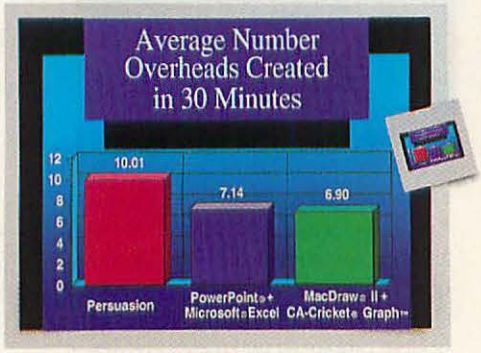
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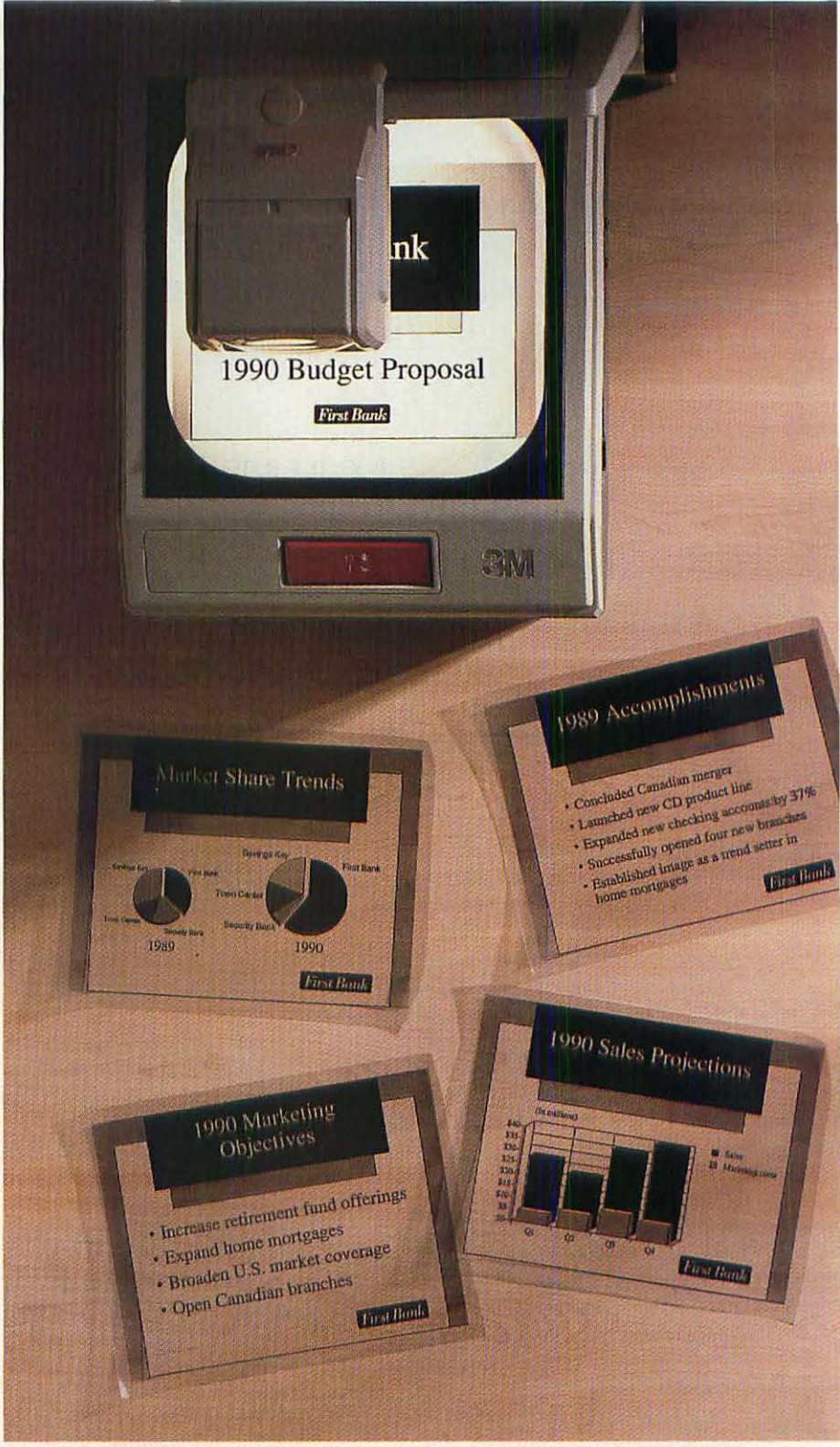
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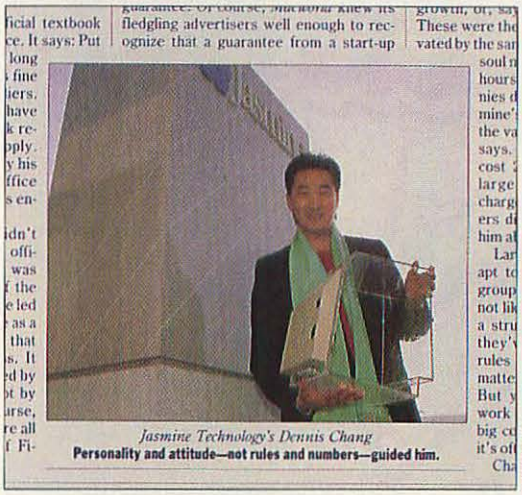
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Jasmine Technology's Dennis Chang
Personality and attitude—not rules and numbers—guided him.

JOHN HARDING

***Inc.* magazine's February 1989 profile of Dennis Chang warned of Jasmine's unconventional financing.**

strong steps to resolve its problems. It has replaced discontinued models with high-quality mechanisms from several sources. It repairs bad drives as quickly as possible. Management has restructured the company and recently laid off about 24 employees to make it more attractive to investors. And it has established new service goals and a new service package shipped with all Jasmine products.

The Extended Service Program, as Jasmine calls it, says no customer should have to wait on hold for more than four minutes. Any customer who has to leave a message should get a return call within 24 hours. And the customer's problem should be resolved within 24 more hours. Schuler claimed that in January Jasmine hit 100 percent service based on those goals. Thus emboldened, the company increased the number of phone lines into its tech support and customer service departments and in February launched the Platinum Flower Service Package. It includes an updated Hard Disk Encyclopedia, maintenance and troubleshooting software, and written guides to customer service and troubleshooting. It's an informative, attractive package. But like Jasmine's Extended Service Program, it may not be enough to salvage the company's reputation.

Jasmine places most of the blame for its current predicament on Rodime and previous Jasmine management. In March 1989 Jasmine filed a $25 million lawsuit against Rodime and former Jasmine executives (including cofounders Mark James and Alan Brunner and former chief operating officer Bryan Speece), alleging that they conspired to lower the value of Jasmine and force its sale. The lawsuit's charges include the claim that Rodime supplied Jasmine with defective drive mechanisms.

Rodime's response was to file a countersuit against Jasmine, demanding $4.7 million in payment for drives. "Given this rather substantial breach of contract, it is standard business practice to discontinue regular services, including warranty and repair, until the situation is rectified," commented Timothy Mahoney, vice president and director of sales and marketing for Rodime. "We are sincerely sorry some end users have been inconvenienced."

The legal issues between the companies are in dispute as defendants fight the charges and press counterclaims. If it's true that Jasmine couldn't pay its only supplier, the company may have been in trouble before Rodime stopped providing repairs and drives. Interviews with former employees suggest that Jasmine's management problems predate its agreement with Rodime. But Rodime's action certainly made things worse, with ramifications that Jasmine is still coping with today.

I asked an informed source, who asked not to be identified, why customers still can't find out when their drives will be repaired. "Every month Jasmine puts money back into repairs from its operating profit," he said. "Customers call for repair status, but the company can't really say what the status is because the operating profit varies from week to week."

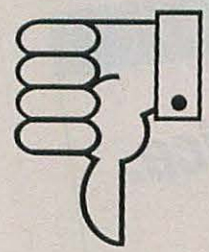
Jasmine's financial problems were confirmed by Schuler during my interview. At one point I asked him to clarify his comments to make sure I understood them: "So the problem with repair parts is that you haven't been able to afford to buy as many as you'd like in order to repair [hard drives] as quickly as you'd like to?" Schuler's

(continues)

Read It And Reap.

Memo To: Mac people who would like to write better
From: Ken Dickens, ad writer
Re: A great new product, a helpful book, and a contest to get both ***FREE***

I'm a skeptic. So when the people at Reference Software told me Grammatik Mac could improve my writing, I said, "Right." Faster, fontier, or even bolder I could believe, but better? Give me a break. I thought, if it was real good, it might help business people write better letters or memos.



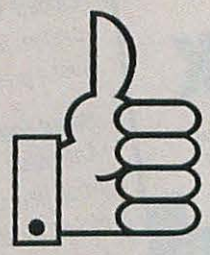
Then again, I do this for a living (not a bad one I might add). So if software can improve my writing, it's fantastic. And I'm not.

Well, two weeks and a whole lot of humble pie later, I'm here to tell you that Grammatik Mac is nothing like those desk accessory style checkers you might have tried. Believe me, it's like an English professor in a box. The thing actually proofreads each sentence and breaks it down into parts of speach. It's scary, remember sentence diagramming? Well, that's basically what it does right on your screen.

I guess that's how it knows if subjects and verbs are in agreement. Prepositions are dangling. Plurals should be possessive. All that stuff I can never remember and have to look up. For example, Grammatik might stop on a sentence like "I feel I should have won the Grammatik Mac Contest, its a real shame", tell you that "feel" is probably incorrect, suggest "think" instead and by the way, "its" should be "it's ." You can ignore the suggestion and move on (which is what I usually do, making the excuse that it's my writing style) or change the offending phrase right then and there. I like that. It lets me fix my mistakes without cramping my style.

Grammatik Mac catches errors like incomplete sentences, improper use of homonyms (like "their" instead of "there"), split infinitives, noun/modifier disagreements, passive voice, and etc. It even flags unbalanced punctuation, transpositions (like form instead of from, capitalization errors, and thousands of others I've never even heard of.

So, what's it done for me? Nothing short of making my writing better. And the more I use it, the fewer mistakes it catches (could I be learning something here?). Anyway, I'm happy to report that I I almost never write in passive voice, that I've solved my its/it's problem, yet I still split lots of infinitives. And I always start too many sentences with and. . . but, that's just my style.



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Ken Dickens

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response: "That's right, because we'd go out of business. And if we go out of business, everybody loses. So part of it is a matter of economy. This company has strictly made repair customers a top priority. And every spare dime and every cent of profit that the company has made in the past year has gone right back into taking care of service problems. But we're only able to do what we're able to do. If it takes us in the normal process of the system six weeks to replace one of the Rodime drives, there's nothing we can do."

Jasmine *is* improving its service. In November I called tech support and was placed on hold for 20 minutes, only to leave a message that was never returned. Twice in February I was able to reach actual Jasmine employees within two minutes of dialing the number. But will the company develop a consistent repair and replacement policy? When Jasmine discontinued its 20MB model, it decided to upgrade all orders to 40MB models at no cost to customers . According to Silvagnia, the company has also replaced many defective 70MB drives with 80MB drives at no cost. But other Jasmine officials say the company is still charging some customers for those and similar upgrades.

Perhaps it's not surprising that Jasmine finds itself in trouble. Although some customer service people tell callers that Rodime is the source of repair problems, the actual culprit may be Jasmine's unconventional financing. Dennis Chang, CEO and one of Jasmine's founders, was not available for an interview. But an article in the February 1989 issue of *Inc.* tells how Chang used personal guarantees and not much more to establish the company. According to *Inc.,* Chang was able to take the company big-time by personally guaranteeing a credit line of $30,000 to buy advertising in *Macworld.* Then he decided to "recycle" his personal guarantee to other suppliers. When it came time to pay bills, *Inc.* said, "Rather than spend all his money on the important suppliers, [Chang] devised a kind of reverse triage: he'd pay the small bills right away and drag out the big ones."

What the *Inc.* article doesn't men-

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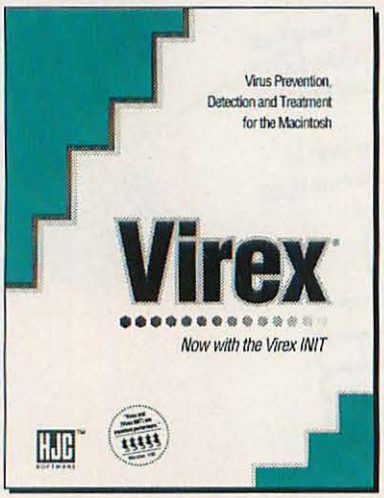
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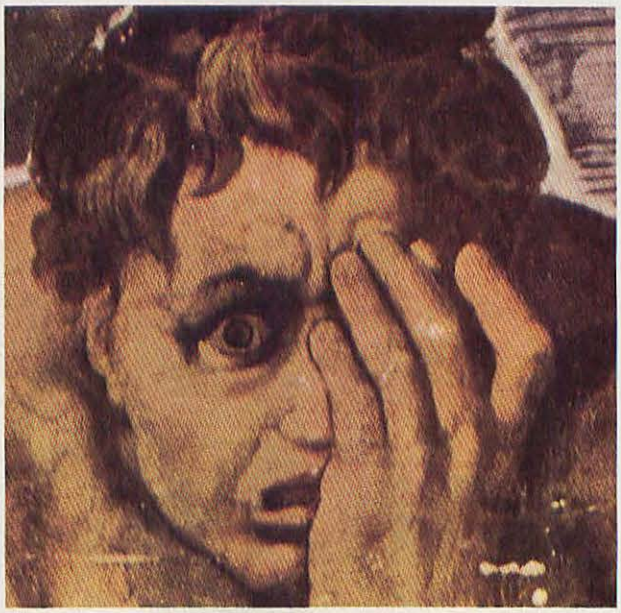
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Circle 463 on reader service card

SERVICE HERO

Lee Carroll of San Diego had an outstanding experience with Microtech after his 40MB hard drive failed a week before Christmas. He called Microtech on December 18, explained his problem, then sent back the drive to the company in Connecticut. "On Friday, December 22, I received my repaired drive back! When you consider the travel time for packages during Christmas, they must have repaired it within 24 hours. Not only that, all my data was still intact."

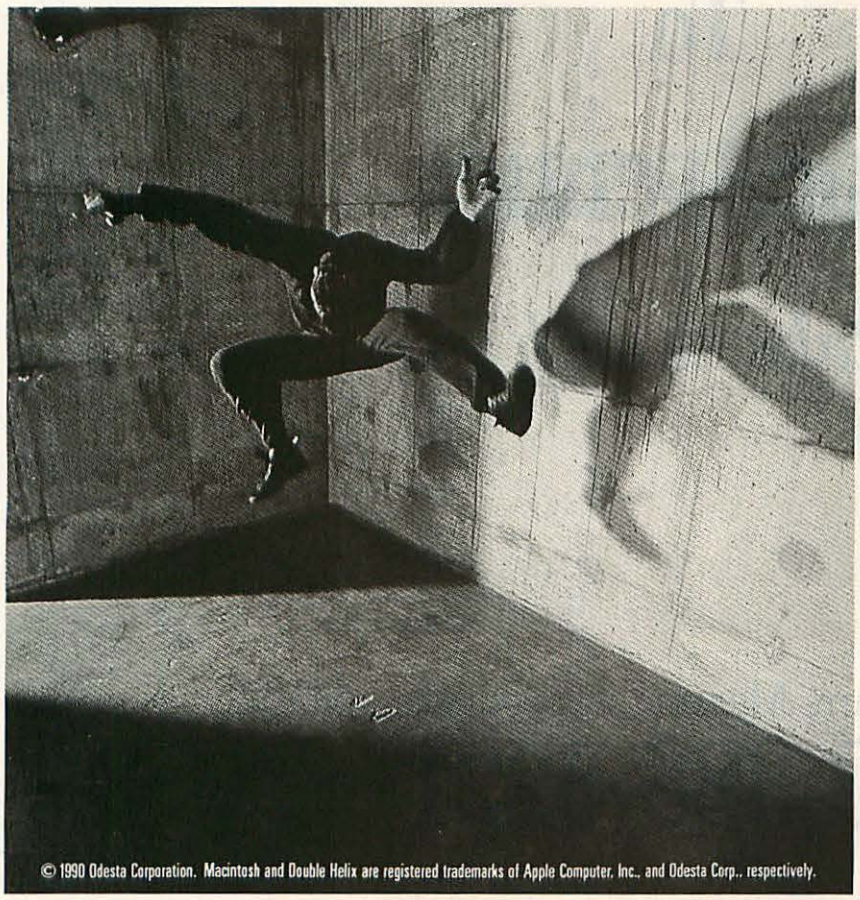
tion is how Jasmine was subsidized by its customers as much as by its suppliers. A healthy direct-sales company generates a lot of cash. Sources say in the old days prepaid orders paid for inventory, drives were assembled, and then shipped to buyers—customers didn't expect prompt shipment.

As we went to press in mid-March, Jasmine laid off 70 of its 100 employees and said it would file for Chapter 11 protection from creditors. Barry Schuler and Patrick Silvagnia are gone. A new president and CEO, William Bayer, is supposed to locate a buyer. Dennis Chang still heads the company. Neither Chang nor Bayer was available for comment, but Jasmine's Scott Gaidano said the company is still accepting orders for drives expected to ship within four to six weeks.

If you used a credit card to order a product and have not received it, immediately contact the bank that issued the card. CitiCorp and American Express said there is no time limit for this type of dispute; they will issue a temporary credit, then investigate the case. Bank of America generally has a 60-day limit for raising charge card disputes, but there are exceptions if you can explain why you waited before notifying the bank. Most of the banks will want your complaint in writing, with the best documentation you can muster. I don't yet have advice for people who paid for products with checks, or for those still waiting for repairs. Call me for a recorded update at 415/978-3149.

Is Jasmine going to be sold or is it going to go under? In either case its customers have a right to feel betrayed. If you haven't bought a drive from Jasmine, don't. And when you do make a purchase elsewhere, use a credit card. It may be impossible to get your money back if you pay by check and something goes wrong. ■

Send nominees for sainthood to Service Heroes, *Macworld*, 501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld1) or Connect (Branscum). Drop *Conspicuous Consumer* a line if a company is ignoring you. If your user group is sponsoring an event, please get in touch.



"Double Helix...is for Macintosh® users who want to solve their information management problems quickly, easily, and without going mad in the process."
Apple Business, November 1989

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Circle 352 on reader service card.

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Our name is MacAvenue and our name means Macintosh products — NOW! Ordered by fax or phone and shipped overnight.

You can expect the best from us at MacAvenue. You deserve it and we're going to give it to you. In fact, our product managers hand-picked every product we stock to bring you the best values on the Macintosh market.

The best namebrand products. The best service. The best and friendliest product support. And — most important — the best price anywhere. Take a look through the following pages. You'll see.

Why Buy From MacAvenue?

That's easy. Price. Service. Personality. It runs in the family.

As the newest division of CompuAdd, MacAvenue is backed by the full resources of a major direct sales organization. With an eight-year record of enormous mail order success, CompuAdd made over $400 million in sales last year and was named to the *Inc. Magazine* 500 for the third year in a row. CompuAdd knows the computer products business inside out, and MacAvenue was born out of CompuAdd's success.

And there's a lot more. Like the amenities we offer. $2.00 overnight shipping. A 30-day money-back guarantee and toll-free, expert technical support for all Macintosh products. Full one-year limited warranties on all hardware. Special order capabilities. Volume discounts. Purchase orders, VISA, MasterCard and American Express accepted with no surcharge.

In the exciting months to come, keep your eye out for new MacAvenue products developed by our own design engineering group and designed to bring you more features and better performance at terrific prices.

Love Us Or Your Money Back

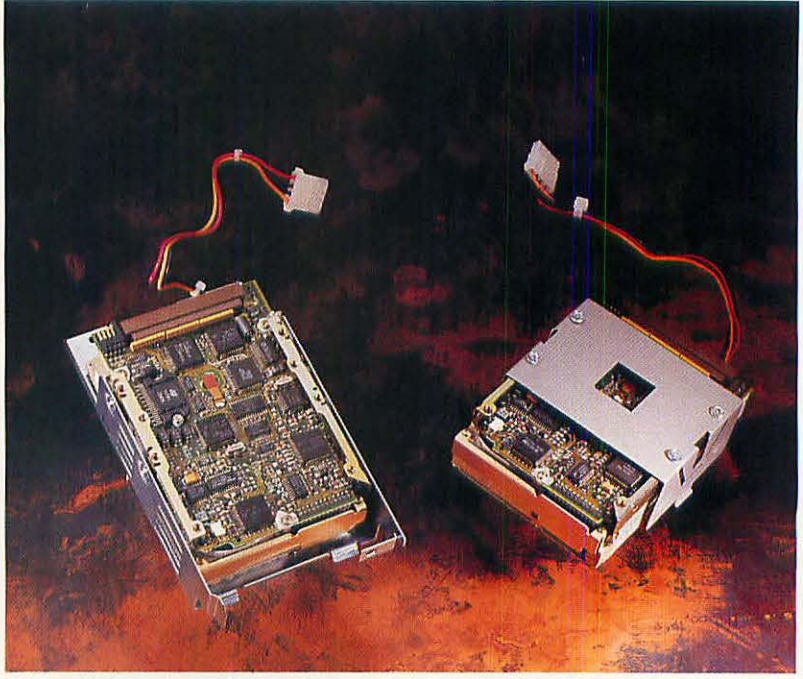
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Order Source For Macintosh Products



Hard Drives



Leave The Driving To Us
High performance, low profile, and minimum power demands. What more can you ask from a hard drive? With features like automatic error correction, high shock resistance, voice coil actuator, SCSI controller and internal air filtration system, CompuAdd internal hard drive kits sport drive components that perform to the most demanding expectations. All CompuAdd internal drives are ready to run, complete with Apple System (including utilities like HD Backup) and the CompuAdd formatter utility that takes care of drive formatting, partitioning, and diagnostics. A detailed instruction manual and mounting hardware make installation a snap. Throw in some of the best technical support in the business, along with CompuAdd's one-year warranty, and your "driving" satisfaction is ensured!

Internal drive kits for SE, SE/30, II, and IIx
20MB Internal HD. *24180* - $325
40MB Internal HD. *24181* - $425
80MB Internal HD. *24182* - $600
100MB Internal HD. *24183* - $700

Internal drive kits for IIcx and IIci
20MB Internal HD. *24184* - $325
40MB Internal HD. *24185* - $425
80MB Internal HD. *24186* - $600
100MB Internal HD. *24187* - $700

CompuAdd Internal Hard Drive Kits

Drive	20	40	80	100
Formatted Capacity	21.4MB	42.65MB	84.3MB	104.9MB
Access Time (ms) Average	27	25	25	25
MTBF (power on hours)	70,000	70,000	70,000	70,000
Transfer Rate MB/sec	1.25	1.5	1.25	1.25
Shock Rating Transit	50G	50G	50G	50G
Weight	<1.1 lbs.	<1.1 lbs.	<2.0 lbs.	<2.0 lbs.



External Hard Drives

Drive	20	45+	80+	100+
Formatted Capacity	20.6MB	46.7MB	81.5MB	105MB
Access Time (ms) Average	65	28	28	19
MTBF (power on hours)	100,000	70,000	70,000	50,000
Transfer Rate MB/sec	1.5	1.5	1.5	2.0
Shock Rating Transit	60G	60G	60G	60G
Dimensions		2.25"ht x 9.5"d x 9.5"w		
Weight, less than	<10 lbs.	<10 lbs.	<10 lbs.	<10 lbs.

Drive, Drive, Drive
A dependable, preformatted Cutting Edge disk drive fits so neatly under your Macintosh, it'll be hard to remember that you bought it separately. The Cutting Edge housing — as sleek as it is rugged and compact — features the same convection cooling as your Mac does, so the drive runs quietly, too. Easy to install. Complete with SCSI cable (with lifetime guarantee), Apple System, HD Backup utility, anti-viral software, and integrated SCSI controller. Also includes a personalized copy of TCE Manager formatting and diagnostic software and, of course, a one-year manufacturer's warranty. Cutting Edge hard drives give new meaning to the word "productivity."

20MB Hard Drive. *24386* - $359
45+MB Hard Drive. *24387* - $499
80+MB Hard Drive. *24388* - $649
100+MB Hard Drive. *24389* - $899

• *30-day money-back guarantee.*

First Adobe® PostScript® Laser Printer For Under $2500!



22851

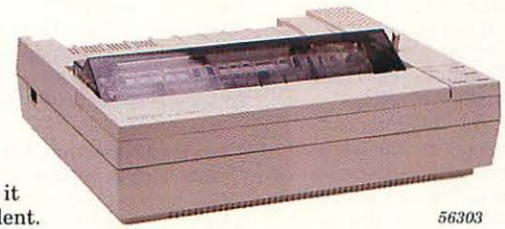
A microLaser With MACROapplications
The TI microLaser™ PS is a truly remarkable Macintosh-compatible PostScript printer. Compact, user-friendly, upgradeable *and* affordable, its standard features can be enhanced to print your applications with style — your style.

Featuring a complete package of Adobe PostScript *and* HP LaserJet Series II emulations, the microLaser PS prints at 300x300dpi and sports 11 PostScript font families with a total of 35 different fonts — all in an infinite array of point sizes. The microLaser fits neatly on your desk because there are no paper tray wings. Its 250-sheet paper drawer conveniently slides into the machine and accepts paper weights from 16 to 34 lbs. For further options, you can easily add a second paper drawer (250-sheet capacity), which fits underneath the printer, or the optional envelope feeder which hooks onto the manual paper slot and automatically feeds up to 40 envelopes. And upgrading the standard 1.5MB RAM is as easy and economical as adding memory boards — up to 4.5MB RAM total. The microLaser is LocalTalk-ready and compatible with the Centronics® parallel interface.
microLaser PS. *22851* - $2425
Envelope Feeder. *38712* - $299
Second Paper Drawer. *38713*- $325



56339

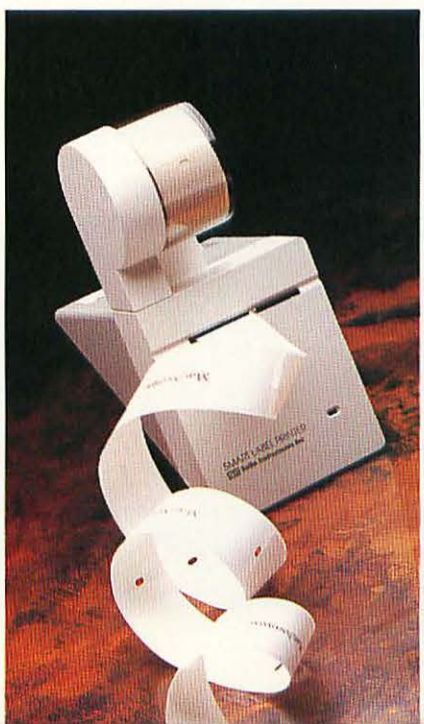
A Family Of Printers
When it comes to impact printers, the Epson name is synonymous with quality. The Epson LX-810 is a hard-working 9-pin, 80-column, dot-matrix printer that works as well for the business user as it does for the student. With an 11-inch carriage, it prints in draft mode at 180cps and in near letter quality at 30cps. Delivers 240x216 bit-mapped graphics and features three resident fonts.
Epson LX-810. *56303* - $199



56303

For higher quality dot-matrix output, the 24-pin Epson LQ-510 adds letter quality print, user-defined characters and more font choices and typestyles. 11-inch carriage. Automatic cut sheet feeder. Prints 180cps in draft mode and 60cps in letter quality mode. Produces 360x360 bit-mapped graphics.
Epson LQ-510. *56340* - $349

For speed, economy and impact you can't beat the the Epson LQ-2550, Epson's top-of-the-line dot-matrix printer. With a 15-inch carriage, the LQ-2550 provides letter quality documents at an amazing 133cps. 400cps in draft mode. 360x360 bit-mapped graphics. Eight resident fonts and hundreds of typestyles. Seven-color capability with multi-colored ribbon.
Epson LQ-2550. *56339* - $999



Grappling With Printer Reality
If the question is, "How does my third-party printer connect to my Mac?", the answer is an Orange Micro Grappler. The Grappler connects to Epson, Hewlett-Packard, Toshiba and other 9-pin and 24-pin dot-matrix printers, including the Epson printers listed on this page.
Orange Micro Grappler. *22853* - $136



22853

Defies Any Label
Remember the awful '80s when printing labels from your Mac was about the LEAST fun you ever had? Now the new Seiko Label Printer promises us all a brighter future in the '90s. Prints letter-quality labels, bar codes, and large type without ever interrupting your other computer work. Takes only a small space, operates quietly and independently of other printers.
Seiko Label Printer. *22852* - $195

Call ***800-388-6221*** •



22512

Get The Network Under Control
Install a PhoneNET Star Controller in your telephone closet to add ease and efficiency to a network of up to 48 nodes. Connect several Star Controllers and you can manage hundreds of users. Takes advantage of existing telephone wiring. Makes connecting to the network as easy as plugging in a phone! Monitors network activity continuously for signs of trouble and protects the rest of the network by shutting down problem ports automatically. Allows network managers to install, re-configure, and manage networks easily from the central phone closet.
PhoneNET Star Controller. *22516* - $888
Star Wiring Kit Harmonic. *22518* - $64

Connecting The Best
Farallon's PhoneNET Star Connectors make clean connections to the branches of star-configured networks. To get proper resistance and prevent error-causing network reflections, simply plug the pre-terminated Star Connector into the branch device. Comes with Farallon's lifetime guarantee and unlimited phone support.
PhoneNET Star Connector.
22512 - $18
PhoneNET Star Connector 10 pack.
22515 - $138

Bridging The Gap
If your network has exceeded the 32-node limit (or slowed to a crawl before it even reached the limit), it's time for a Hayes InterBridge. InterBridge lets you connect local LocalTalk networks or bridge the gap between remote networks equipped with modems. The InterBridge actually enhances overall network performance while it ties networks together. Lets more people communicate and share printers or other devices on connected networks, too. InterBridge Manager software included enables network managers to customize network connection for particular needs.
Hayes InterBridge. *22509* - $645



22504

22505

Gaining Speed
If your company is expanding by leaps and bounds, the last thing you need is lackluster network performance. Give your growing LocalTalk network a speed boost with Shiva's NetBridge. Plug in two LocalTalk networks and the Shiva NetBridge will make network deterioration a thing of the past. NetBridge is a natural network builder; it doubles your network capacity when you plug it in. Software provided ensures network security and hassle-free network management.
Shiva NetBridge. *22505* - $339

Share And Share Alike
Get the most use from your serial peripheral devices by sharing them on the network. Printers, scanners, high-speed modems, or plotters — the Shiva NetSerial connects most serial peripherals to your LocalTalk network. Offers transfer rates up to 57,600 bit/sec with simple 8-pin, mini-DIN connections from LocalTalk to several brands of minicomputers.
Shiva NetSerial X232. *22504* - $275

Crossing Network Borders
You no longer need one box to serve as a gateway, another to share serial devices and a third to connect to remote networks. Now you can connect an EtherTalk LAN and two LocalTalk LANs to create a fully-functional internet. Link the internet to a serial port so all workstations can access peripherals on the other side. Or use the serial port and a modem to connect remote internets. You can even dial in to your internet through EtherGate from a remote Mac or PC with a modem.
Shiva EtherGate. *22508* - $1825



22509

Get All Kinds Of Access
If your workgroup shares peripherals via LocalTalk, now you can share a 2400 or 9600 baud modem as well. Shiva's NetModem enables everyone on the network to transmit data over phone lines. The network user simply selects the NetModem in the Chooser, starts the communications software — and the transmission begins. Flashing messages in the Mac menu bar enable senders to monitor transmissions without leaving the office. And, if you're on the road, you can call the NetModem to send messages by electronic mail.
Shiva NetModem V2400. *22507* - $435
Shiva NetModem V32. *22528* - Call

- *Full one-year limited warranties on all products!*



22507

22508

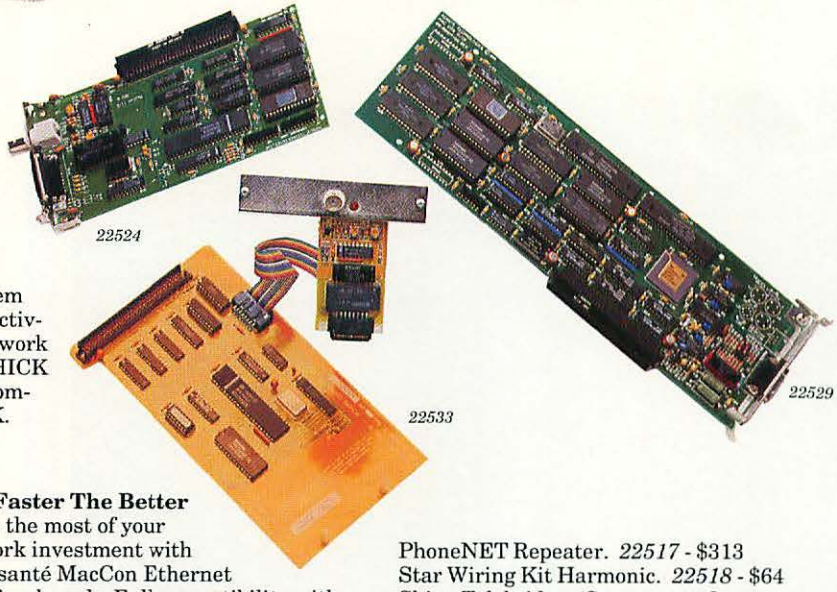


22523

22521

Another Apple Connection
How can something as simple as a good LocalTalk cable connector be so hard to find? MacAvenue has the answer with its guaranteed LocalTalk connectors. Fits right in to any LocalTalk set-up. Just make the connection and you're in business.

MacAvenue LocalTalk Connectors
DB-9 LocalTalk. *22520* - $32
DB-9 PhoneNet. *22522* - $23
DIN-8 LocalTalk. *22521* - $32
DIN-8 PhoneNet. *22523* - $23



22524

22533

22529

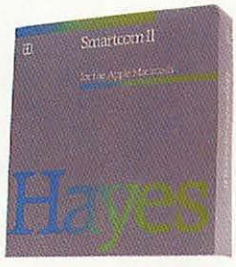
You Gotta Have Connections To Get Anywhere!
Need to connect your Mac to an Ethernet network without losing your internal slot? The Adaptec Nodem lets you do so without compromising network connectivity. The Nodem can also be used as a temporary network "dock" for portable computers. Available for your THICK or THIN (Cheapernet) networking requirements. Compatible with all Macintosh models except 128K/512K.
Adaptec Nodem THICK. *22500* - $395
Adaptec Nodem THIN. *22527* - $395.



The Faster The Better
Make the most of your network investment with the Asanté MacCon Ethernet interface boards. Full compatibility with AppleShare, Novell's Netware and TOPS. Among the fastest Ethernet boards on the market, the Asanté MacCon II/E supports full 32-bit data transfer at speeds up to 10MB/sec over distances up to a thousand feet.

	Mac II	SE	SE/30
Thick	*22524*	*22525*	*22526*
Thin	*22524*	*22533*	*22530*
Twisted Pair	*22529*	*22532*	*22531*
MacCon	**$395**	**$295**	**$395**

Dove Fastnet SE Ethernet card. *22501* - $353
Dove Fastnet III Ethernet card. *22502* - $373
Dove FastPath 4 Gateway. *22510* - $1935
Farallon Portable Pack. *22519* - $373
PhoneNET DB-9 Connector. *22511* - $28
PhoneNET Din-8 Connector. *22513* - $31
PhoneNET to LocalTalk Adaptor. *22514* - $31
PhoneNET Repeater. *22517* - $313
Star Wiring Kit Harmonic. *22518* - $64
Shiva Telebridge. (See page 14 for description.) *22506* - $339
Tops Flashbox. *22503* - $108

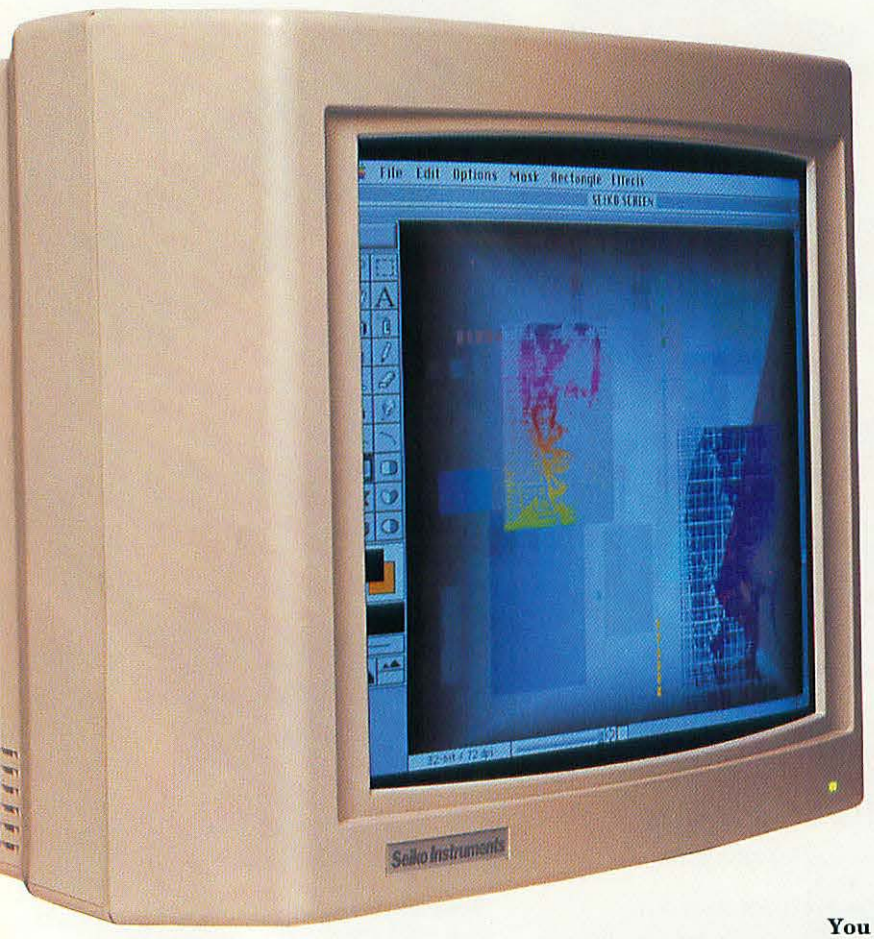


Smarter Communications
Enjoy fast and simple connections to remote computer systems with the help of Hayes SmartCom II communications software. Uses the Mac graphical interface to let you simultaneously print, store and view incoming data.
Hayes SmartCom II. *27662* - $84

Call ***800-388-6221*** •



Video



22002

Color To The Max
The Sigma ColorMAX monitor brings presentation graphics, illustrations, and design applications to a new level of color display quality on the Mac II. A 19-inch Sony Trinitron screen is the heart of this high-resolution, 256-color monitor. Refreshes 8-bit color at 70 plus Hz.
Sigma ColorMAX 19-inch Color Monitor.
22000 - $4999

One Page At A Time
Get a new view of the world with the PageView full-page display system for the Mac SE. Control Panel enables you to select display modes, system font sizes, screen save, dual or single screen operation mode, and cursor size.
Sigma PageView 15" SE. *22101* - $999
Sigma PageView 15" SE 30.
22106 - $1050
Sigma PageView 15" Mac II.
22100 - $1050

Color You'll Remember
E-Machines' high-resolution, 256-color monitors provide stunning color display for the Mac II utilizing a specially adapted Sony Trinitron picture tube. The 16-inch monitor refreshes at 67 Hz while the 19-inch monitor refreshes at 71 Hz. Once you've seen THIS kind of color, you'll never be able to settle for less!
E-Machines T-16 Color Monitor.
22003 - $3199
E-Machines T-19 Color Monitor.
22004 - $4665

You Gotta Wear Shades
The Seiko 14-inch color monitor and RasterOps Color Board 264 create BRIGHT colors. 43% brighter than the Apple solution. And the picture is sharp all the way to edge of the screen. By combining Sony Trinitron technology and RasterOps 24-bit color technology, the Seiko monitor gives you the best color for the best price!
Seiko 14-inch Color Monitor. *22002* - $595
RasterOps Color Board 264. *23531* - $699



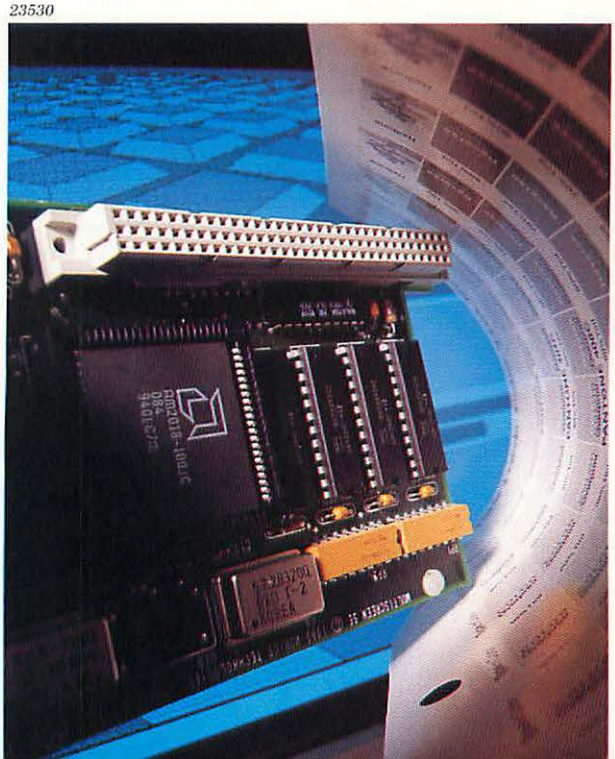
More View For The Mac
Exploit the full power of the Mac II with the Sigma SilverView 21-inch monitor. The 72dpi display area gives you both single-page and two-page spread displays. A fast-moving 73 Hz refresh rate means you'll never be bothered by a flickering screen. You'll get more precise graphics and better layouts because you can view full pages and spreads. Customize the monitor to fit your style with the tilt/swivel stand and full contrast/brightness controls.
SilverView Mac II Monitor. *22104* - $1599
SilverView SE 30 Monitor. *22103* - $1599
SilverView SE Monitor.
22107 - $1599

See Me. Feel Me. Touch Me.
Install the Microtouch Mac 'N Touch touch screen over your Mac SE, AppleColor, or other monitor, connect it to the Apple Desktop Bus and — wow! — your monitor turns into the gateway to your software. No more imposing than an antiglare filter, the Mac 'N Touch is the ultimate intuitive interface. Touch any icon on the screen and drag it where you need it with your finger. With a resolution of 1000x1000 touch points, the Mac 'N Touch averages the points you tap or touch to one precise pixel position. Ideal for self-running demos. Works with most software without modification.
Mac 'N Touch. *22202* - $445



29222
29224

23530



Super Human Graphics
Silicon Beach's SuperPaint helps you create graphics for high-resolution output with a sophisticated AutoTrace tool that automatically converts paint graphics into draw objects. Then, with its SuperBits feature, SuperPaint sets you up to edit the bitmaps. Pair these powerful features with text manipulation, calligraphy, brushes and a freehand tool for Bezier curves, and you have a world class graphics package.
SuperPaint. *29222* - $124

Set Your Imagination Free
Retouch photographs, recombine elements from several images, and rediscover your creativity with Digital Darkroom. Special effects include solarization and blurring as well as stretching and other perspective changes. Digital Darkroom's tools allow you unlimited gray-scale image manipulation. And, when you've captured the masterpiece, Digital Darkroom produces high quality halftone output.
Digital Darkroom. *29224* - $248

The Big Screen Experience
When you're ready for a larger monitor, the first step is a Mobius MultiScreen SE Video Card. Links the Mac SE to most monochrome monitors including the Apple Portrait Display. Supports dual-screen display, meets stringent standards for portrait display, and redraws the screen 30% faster than your original SE monitor.
Mobius Multiscreen Card. *23530* - $295

Input Devices

Mice

A. Turbo Charged!
Trackball users have different reasons for leaving their mouse behind, but the Kensington Turbo Mouse is one of the most popular. Sensing your movements, it adjusts cursor speed accordingly. Move slowly for pinpoint precision. Speed up and the cursor accelerates with you.
Turbo Mouse ADB. *25281* - $107
Turbo Mouse Plus. *25280* - $107

B. Mousing Around
Find yourself too often in a mess with your mouse cord? The Mobius Cordless Mouse uses infrared technology to control the cursor up to 20 feet away. Fine-tune mode for smooth, precise cursor control. A separate button controls extra fine and accelerated movement.
Mobius Cordless Mouse. *25282* - $97

Keyboards

C. A Key Part Of Your System
An extended keyboard that works with ANY Macintosh, the DataDesk MAC 101 adds all the F-Keys and other key commands — even to an older Macintosh. Costs less than the Apple model, too! And, if you have a Plus or earlier Mac, you have real cause to celebrate.
MAC-101 Keyboard, ADB. *25180* - $134
MAC-101 Keyboard, Beige. *25181* - $134

Scanners

D. Handmade
If you need to scan images into your Macintosh documents but can't set up an elaborate scanning station, try the hand-held ScanMan from Logitech. You'll get 32 shades of gray in photographs, drawings, logos, and illustrations up to four inches wide. Connects directly to the Mac SCSI for easy installation. Resolution from 72dpi to 400dpi delivers a quality image both on screen and on paper.
ScanMan 32. *22751* - $320

E. The Future Is In Color
The MicroTek 300Z Color Scanner is a full-featured color scanner at a gray-scale price. Get 16.8 million colors with 256 shades of gray and 24-bit color at 300 dpi. Includes SuperPaint and Digital Darkroom.
MicroTek 300Z Color Scanner. *22755* - $2150

MicroTek MS-II B&W Scanner. *22756* - $1080
Complete Page Scanner. *22753* - $758
Complete Halfpage Scanner. *22752* - $313
ThunderScan 5.0. *22754* - $176

• *90-day no-cost product replacement.*



A
25281

Digitizers

F. Super Big Chief Tablet
Brings a tear to the Big Chief's eye. This SummaGraphics Bit Pad Plus digitizes information as you "draw" on the tablet. Trace drawings or sketch freehand. Then, in a wink, view the image. Also performs all mouse functions — guides the cursor, selects icons, and opens files. Beats the heck out of those Magic Slates we had as kids!
SummaGraphics BitPad Plus. *26885* - $318

Sound

G. Music Master
The PassPort MIDI Interface opens up the world of music on your Mac. Installation is simple — Passport MIDI draws its power from the Mac so it requires no additional adaptor. Actually allows you to connect *several* instruments in a daisy-chain.
PassPort MIDI Interface. *23732* - $76

Put That On The Record
Add sounds to the sights in your presentations. MacRecorder digitizes sound from any source — the audio digitizer has a built-in mike — and gives you the tools to edit the recording. Special effects included.
MacRecorder. *23730* - $162

Electronics

Power Supplies

H. Don't Stop The Power
When a surge suppressor just doesn't offer enough protection, plug your Mac into an Uninterruptable Power Supply from American Power Conversions. This UPS draws on its battery to keep your system running after a power failure until you can back up and exit properly. The UPS can even initiate an unattended network shutdown when you install it on a network server. Uninterruptable Power Supply. *26292* - $425

Accessories

I. Heat Up, Cool Down
When things heat up, you can keep your Mac cool with the Fanny Mac, a combination cooling fan and surge suppressor. Pulls cool air through to keep memory and/or internal drives from overheating.
Fanny Mac. *26880* - $58

Dial "A" For Automatic
Install HyperDialer, open your HyperCard rolodex, and you're ready to dial any number at the click of your mouse. Also dials phone numbers from QuickDex, Focal Point, Sidekick, and SuperCard address books. *No modem required.*
HyperDialer. *26886* - $23

Kensington System Saver, Beige. *26888* - $62
Kensington System Saver, Platinum. *26889* - $62
Power Strip Surge Suppressor. *40508* - $68.95

Connectors

J. We Have The Best Connections
When you're building a Mac system, use quality MacAvenue cables.

MacPlus, SE, Mac II to Hayes-compatible modem. 6 ft. *26285* - $25

MacPlus, SE, Mac II to Imagewriter II. 6 ft. *26287* - $25

MacPlus, SE, or Mac II to Imagewriter. 6 ft. *26286* - $25

Mac to SCSI System cable. 2 ft. *26280* - $39

Mac 128/512 Hayes-compatible modem cable. 6 ft. *26281* - $25

Mac 128/512 to Imagewriter. 6 ft. *26282* - $25

MacPlus, SE II to Apple modem. 6 ft. *26284* - $25

K. SCSI Extension Cable
SCSI Extension cable. 6ft. *26288* - $25
SCSI System cable. 6ft. *26290* - $35
SCSI Peripheral cable. 2ft. *26289* - $25
SCSI Peripheral cable. 6ft. *26291* - $35

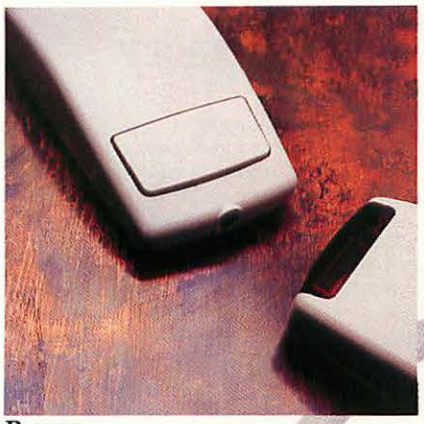
MacPlus peripheral adaptor cable. 6 ft. *26283* - $25

Extra long ADB cable. *26900* - $24

L. Another Kind Of Connection
Connect two peripheral devices to one serial port, or connect two computers to one peripheral with the Kensington A-B Box. Compatible with all Macintosh models and with the Apple IIGS.
Kensington A-B Box. *26890* - $65.



K
26288



B *25282*



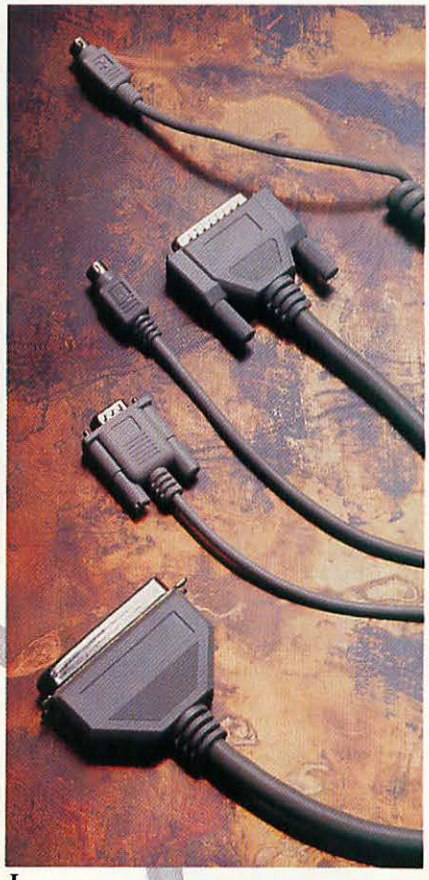
F *26885*



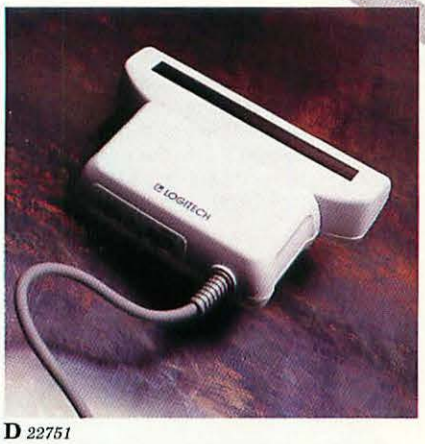
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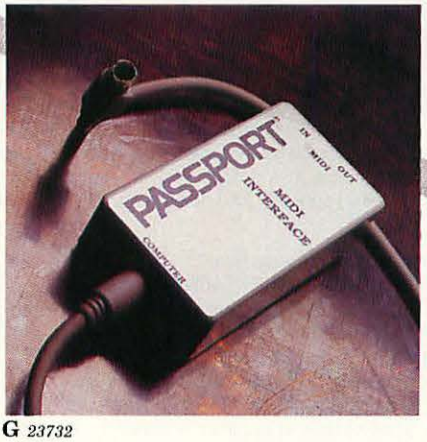
C *25180*



J



D *22751*



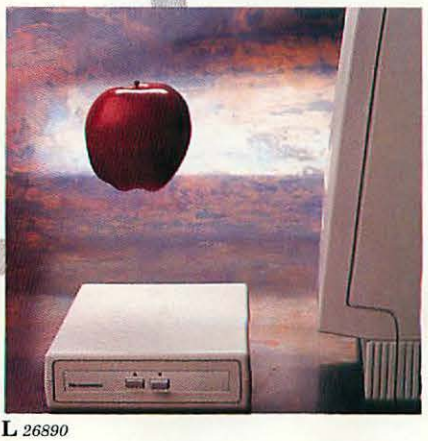
G *23732*



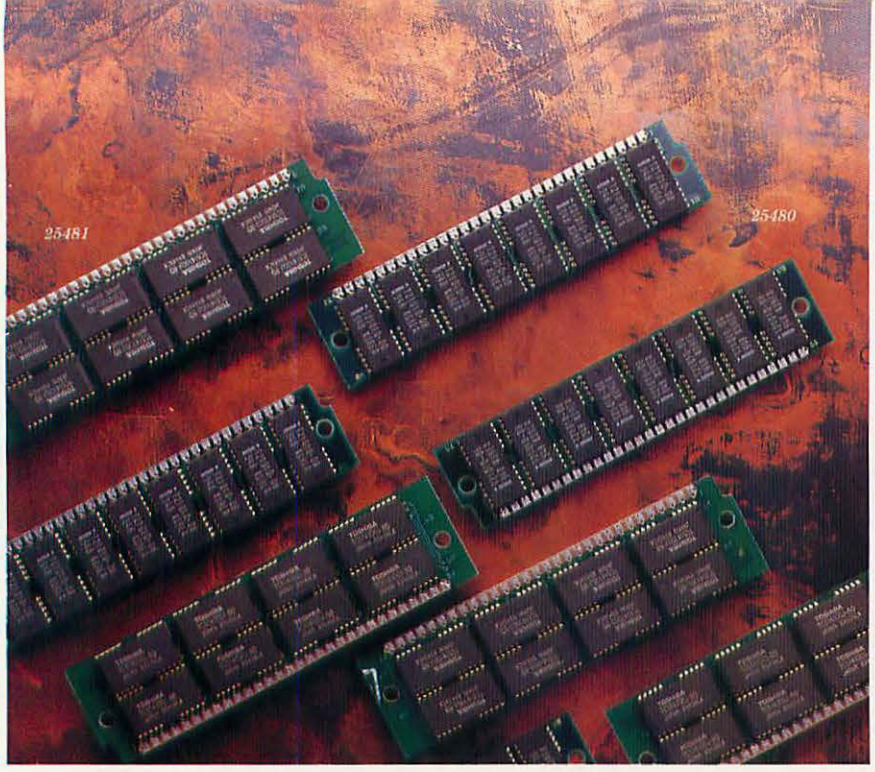
E *22755*



H *26292*



L *26890*

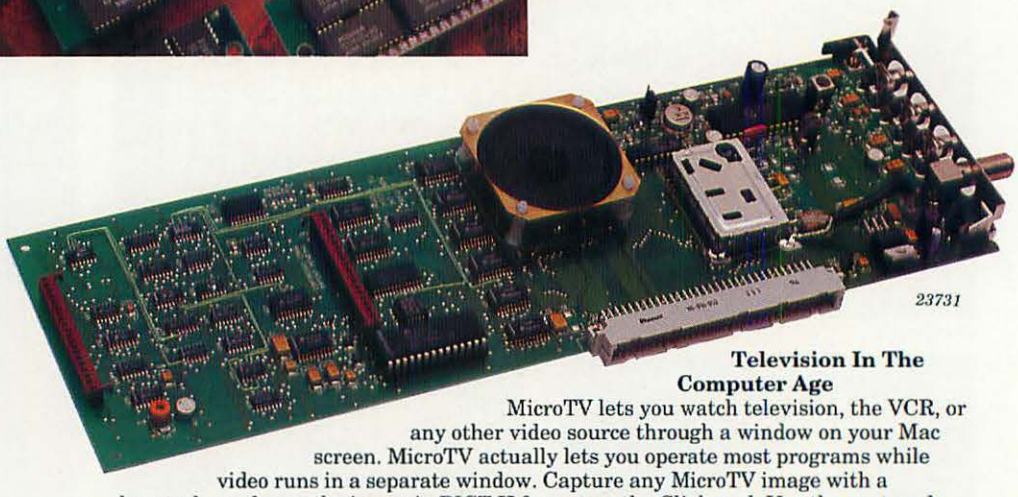


Memory

Build Your Memory
Face facts. Newer and more powerful software programs are memory hogs. You always need more RAM. With 2MB to 4MB you can run at least a couple of applications with MultiFinder. If you really want to get serious, four of the new 4MB SIMMs means you'll have 16MB of RAM power, and that means the sky's the limit. MacAvenue offers only the best surface-mounted products. And you'll get a step-by-step installation guide and a tool to "crack" the Mac Plus or SE.
1MB SIMM. *25480* - $Call
4MB SIMM. *25481* - $Call

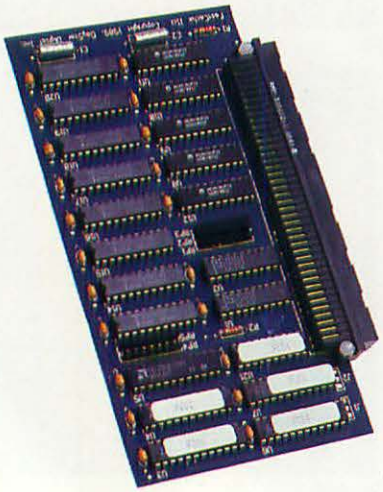
Boards

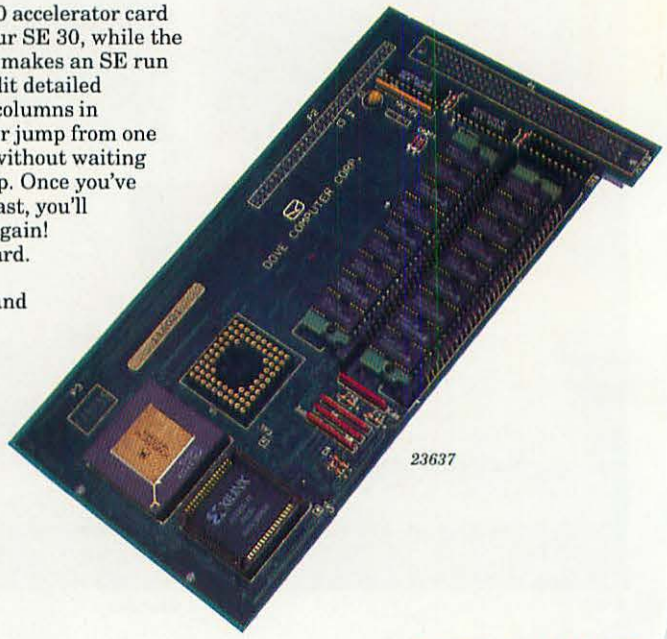
Full Speed Ahead
DayStar Accelerator Cards can double or even triple the performance of your Mac II, IIx, IIcx or IIci by giving you up to 12 MIPS of unbelievably fast processing power. DayStar cards have a long-standing record of reliability and high quality. All cards come ready to use. Simply plug into the NUBUS slot.
DayStar 030 - 25MHz II/IIx.
23632 - $1795
DayStar 030 - 33MHz II/IIx.
23633 - $3095
DayStar IIci Cache Card. *23634* - $754



Television In The Computer Age
MicroTV lets you watch television, the VCR, or any other video source through a window on your Mac screen. MicroTV actually lets you operate most programs while video runs in a separate window. Capture any MicroTV image with a keystroke and save the image in PICT II format on the Clipboard. Use the captured image in a newsletter, report, or any other document. Includes 32-bit QuickDraw, channel control, and onboard tuner. Aapps MicroTV. *23731* - $275

Win The Marathon
Dove's MaraThon 68030 accelerator card doubles the speed of your SE 30, while the 16MHz 020 accelerator makes an SE run faster than a Mac II. Edit detailed graphics and calculate columns in complex spreadsheets or jump from one application to another without waiting for your Mac to catch up. Once you've seen your Mac go this fast, you'll never want to go slow again!
Dove 33MHz SE 30 Board.
23636 - $965
Dove SE 020 with 881 and 1MB. *23637* - $875





• *If you don't see what you want, call.*

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Love us or your money back. $2 overnight delivery! Toll-free expert product support. 30-day money-back guarantee on anything and everything you purchase. Full one-year limited warranties on all products. Quantity discounts. And, if you don't find what you want here, call us. We'll get it for you. Call toll-free TODAY!

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No questions asked. Every product MacAvenue sells will give complete satisfaction. If not, return it in the original packaging within 30 days of purchase. We'll refund your money *or* we'll pay the return freight, replace the product with new merchandise, and pay the freight back to you.

2. Toll-Free Technical Support • 90-Day Product Replacement
Should you experience a problem with anything you purchase from MacAvenue, call our product support staff at 800-766-6221 weekdays from 8:00am to 7:00pm, CST. We will be happy to assist you with any hardware or software difficulty. If we cannot resolve the problem over the phone, we will assign you a return material authorization (RMA) number and a Federal Express number. We will replace the product with equivalent merchandise and pay the shipping both ways.

3. One-Year Limited Warranty • We Pay Return Freight
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Fax

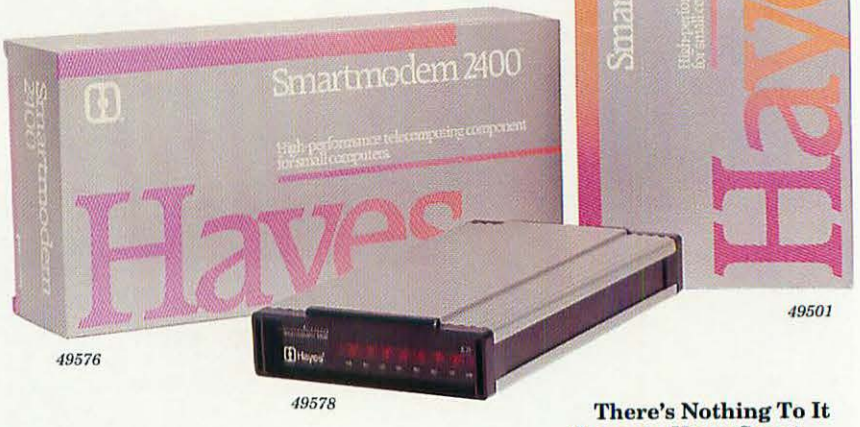
Just The Fax, Ma'am
This indispensable communications unit combines fax transmission, a graphic image scanner, and smooth user interface to your Mac. Sends and receives text and graphics by downloading files from Mac or standard paper input. Quite portable and easy to install. Can also be used as a desktop copier.
Relisys Telefax RA2110. *56072* - $1295

Modems

Link Your Mac To The World
The DataLink Mac is an internal 2400 baud modem for your Mac II which includes its own serial port, allowing you to add extra serial devices. The DataLink Mac can also be upgraded to send fax messages, when you're ready.
DataLink Mac. *22307* - $325

Expressly For The Mac
Hayes-compatible at 300 to 2400 baud, Applied Engineering's DataLink Express is the external modem made expressly for the Mac. Status light array enables easy monitoring of all transmissions. Package includes comprehensive communications software. Optional Send-Fax capability.
DataLink Express. *22306* - $215

A Port-A-Modem Deluxe
Designed specifically for the Macintosh Portable, the DataLink/Mac Portable is a state-of-the-art 2400 baud internal modem featuring error correction, a Send-Fax support option and low power operation which can extend the life of the Portable's battery. The modem also supports "Sleep mode," automatically cutting off power to most of the board when the modem is not in use. Software included.
DataLink/Mac Portable. *22308* - $299



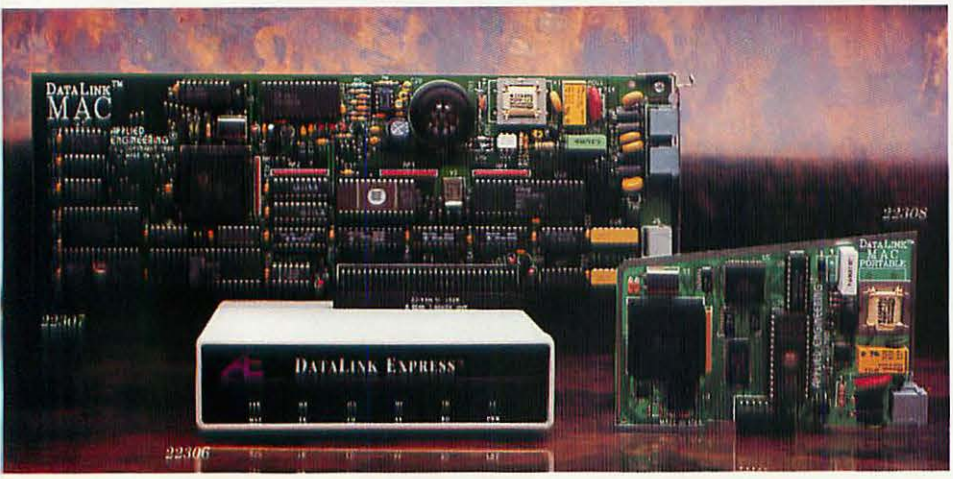
49576

49578

49501

Send It Fast!
Whether you're transmitting vital program code or valuable text documents, using the V-series Hayes Smartmodem 9600 assures maximum reliability for your data. Selects speed automatically on the initial handshake and transmits from 9600 down to 300 baud. On-line compression enhances data throughput, cutting data transmission time in half. Saves operator time by analyzing connection possibilities and choosing the most efficient option. (That means you pay less for transmission time!)
Hayes Smartmodem 9600. *49578* - $895

There's Nothing To It
Connect a Hayes Smartmodem 1200 or 2400 to your Mac, plug it into a phone jack, and you're ready to transmit and receive data. The Smartmodem 1200 adjusts speeds automatically from 1200 to 300 baud, monitors the connection, redials the last number called until it makes a connection, and can receive calls unattended. The Smartmodem 2400 automatically sets transmission rates from 2400 to 300 baud and features digital signal processing, full international compatibility, call progress monitoring, and self-diagnostic tests.
Hayes Smartmodem 1200. *49501* - $299
Hayes Smartmodem 2400. *49576* - $385



From One State To Another
If you're a long way from the office but want to keep in touch, the Shiva TeleBridge will make you feel like you're right next door. With a Shiva TeleBridge and a high-speed modem at each location, you can print documents and send electronic mail to the New York office from the beach in Malibu. Now that's communicating! The only bridge that supports transfer rates up to 57,600 bit/sec, the TeleBridge can move vast amounts of data from coast to coast in minutes. With this equipment, who needs overnight mail service?
Shiva TeleBridge. *22506* - $339

CompuAdd Modems
CompuAdd Modem 1200 baud.
22304 - $99
CompuAdd Modem 2400 baud.
22305 - $159

• *Full one-year limited warranties on all products!*

Storage



23831

You Can Take It With You
Loss, theft, and hardware failures are the enemies of data security. But with this 44MB Bernoulli hard drive you can give your data both security and portability. Use it with the new Macintosh portable or on your desktop. A portable drive makes a wonderful solution to the problems of backup and storage, too. Operates for two hours between battery charges. Offers nine utilities to manage and safeguard data. And, PageMaker fans, this storage device is endorsed by Aldus.
IOmega Portable 44MB Hard Drive.
24385 - $1850

IOmega Bernoulli Cartridge 3 Pack.
57805 - $199

Laser Power
An 800KB drive is a convenient and useful peripheral for your Macintosh. The Laser 800KB Floppy Drive gives you fast 12ms seek time along with quiet, reliable operation.
Laser 800KB Floppy Drive. *24734* - $175

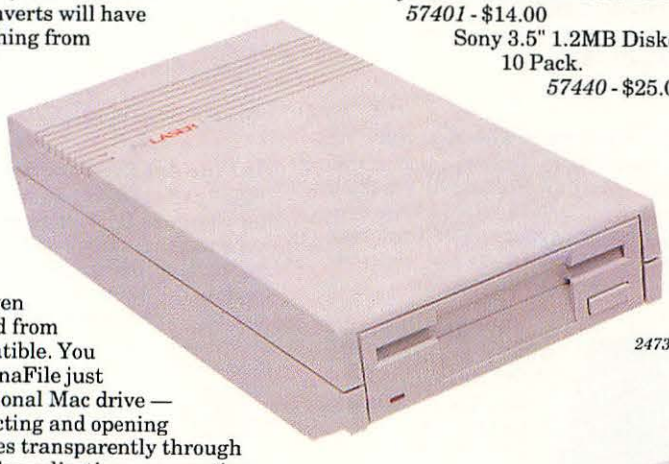
Translation, Please
Sooner or later, even dedicated Macintosh converts will have to read something from a DOS floppy again. With DaynaFile, you'll never have to worry again about remembering any complicated command-driven process to read from an IBM-compatible. You manage a DaynaFile just like a conventional Mac drive — dragging, selecting and opening files. It operates transparently through your Macintosh applications, connecting to your Mac through the SCSI port. A DaynaFile can be daisy-chained to as many as six devices, and its icon appears on your desktop.
DaynaFile 5.25" 1.2MB. *24732* - $550
DaynaFile 5.25" 360KB/1.2MB.
24733 - $725

Quick, Get It On Tape!
Maximum data security is yours with a Tecmar tape backup. Units include icon-interfaced software and are compatible with all Mac hard drives. Tecmar QTs operate in the background under Multifinder, so you can still use your Mac while you're backing up or restoring. Optional SCSI T-cable makes QT Mac units portable so you can use them with more than one Mac.
Tecmar QT Mac 40MB Tape Backup.
23830 - $950
Tecmar QT Mac 80MB Tape Backup.
23831 - $1225
Tecmar QT-40 Cable Kit.
24931 - $106
Tecmar QT Mac Data Cartridge 3 Pack.
26080 - $85.00

We Have A Special Rapport
Demand more from your floppy diskettes with the help of the Kennect 2.4 Drive. Stores 2.4MB on a 1.2MB floppy and 1.2MB on an 800KB disk. Reads, writes, and formats to all 3.5-inch disk standards — Apple and DOS. For Mac SE 30, IIx, IIcx or IIci.
Kennect 2.4 800KB Drive. *24730* - $325

For your Mac 512KE, Plus, SE or II, use the Kennect Rapport Adapter with your 800KB drive to accomplish what the Kennect 2.4 drive does for other models.
Kennect Rapport Adapter. *24930* - $195

Sony 3.5" 800KB Diskettes 10 Pack.
57401 - $14.00
Sony 3.5" 1.2MB Diskettes 10 Pack.
57440 - $25.00


24734

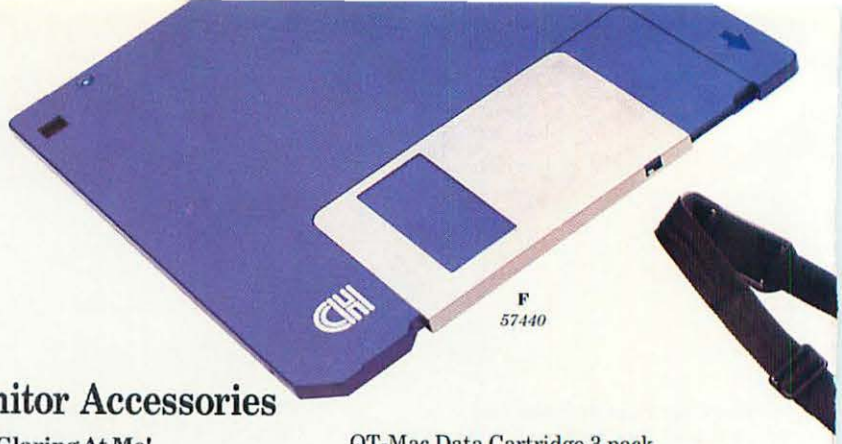


30434

Seek And Ye Shall Find
Use OnLocation to find lost files in seconds. This speedy little utility stores a compact index of your hard disk and scans this index when you type in even one word from a file. OnLocation scans the text of a file, so even if you completely forget a file name, your data isn't lost for good. OnLocation can find text in word processing files and in PageMaker, Excel, or HyperCard files, too.
OnLocation. *30434* - $78


24730

Accessories



F
57440

Carrying Case

A. Hit The Road
Move your Mac in safe style with this padded, water-repellent nylon case. Features locking accessory pocket for disks and fully padded compartments for keyboard and mouse. There's even room for an extra diskette drive.
MacAvenue Carrying Case. *26898* - $65
MacAvenue Ext. Keyboard Carrying Case. *26901* - $76

Covers

MacPlus/SE System Saver Cover. *26894* - $8
Imagewriter II Dust Cover. *26895* - $8
LaserWriter II Dust Cover. *26897* - $12

Stands

B. Space: The Last Frontier
Free up space on your desktop — stand your Mac II CPU securely on its side beneath your desk so just your monitor and keyboard are left in front of you. Kensington kit includes a stand to support the Mac II and extra-long cables for your monitor and keyboard.
Kensington Mac II Stand and Cable Kit. *26892* - $63

Get A Better Look
Stop craning your neck and slumping over in your chair to see your Mac screen! Use a Kensington Tilt/Swivel stand to get a better angle on the computer screen. Tilts to a twenty-degree angle (*your neck isn't THAT long*) and swivels all the way around (that's a three-sixty).
Kensington Tilt/Swivel Stand. *25582* - $21

C. Standing Tall
This printer stand supports most dot-matrix printers, including the Imagewriter. Raises the front 2.5 inches and the back 4 inches to allow you to monitor the printing. Offers paper storage under the printer and paper catcher to keep copy neat.
Kensington Universal Printer Stand. *26896* - $15

Mac II Monitor Stand. *25580* - $62
Mac II System Stand. *26887* - $20

Monitor Accessories

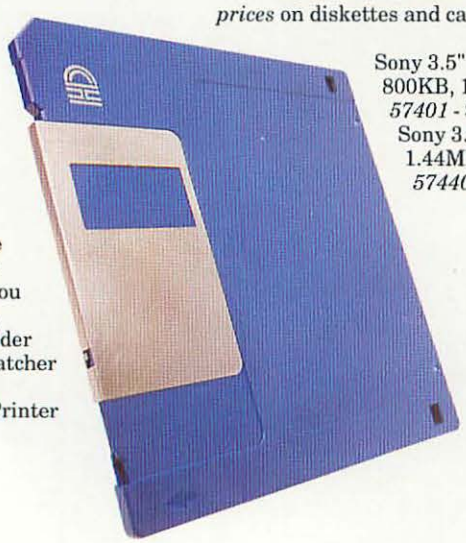
D. Stop Glaring At Me!
Getting a glare off your computer screen can be annoying, cause red eyes and give you a headache. A Kensington Anti-Glare Filter reduces screen glare by 91% and improves screen clarity more than 15 times. Attaches to any Macintosh nine-inch monitor with adhesive fasteners — no tools required. Save your sunglasses for the times when you just want to *look* cool.

Anti-Glare Screen, Beige. *26882* - $32
Anti-Glare Screen, Platinum. *26883* - $32
Apple Color Monitor Polarizing Filter. *26891* - $62
Mac II Monitor Extension Kit. *26899* - $32

Data Storage

E. Wood That It Were
If you enjoy the natural look and feel of wood in your office space, stash your disks in one of MacAvenue's teak boxes. Two sizes.
MacAvenue Teak 3.5-inch single row. *41600* - $20
MacAvenue Teak 3.5-inch double row. *41601* - $29

F. The Medium Is The Message
Trust your data to the best name in the business — SONY. High-quality diskettes mean that you'll have safer storage and transportation of your valuable information. Check MacAvenue's *everyday low prices* on diskettes and cartridges.



Sony 3.5" Diskettes, 800KB, 10 pack. *57401* - $14
Sony 3.5" Diskettes, 1.44MB, 10 pack. *57440* - $25

QT-Mac Data Cartridge 3 pack. *26080* - $85
44MB Bernoulli Cartridge 3 pack. *57805* - $199
5.25" 1.2MB Diskettes, 10 pack. *57200* - $10.99
5.25" 360KB Diskettes, 10 pack. *57000* - $4.99

Et Cetera

G. Now You See It, Now You Don't
This keyboard drawer saves desk space and allows you to get your keyboard out of the way when you need space to think.
MacAvenue Keyboard Drawer. *41753* - $19

H. Let's Keep It Clean, Okay?
Remove hard-to-reach dust and dirt on sensitive computers, diskette drives and monitor screens with Compuduster — now 70% more powerful and environmentally safe!
Compuduster. *41023* - $24

Kleen Keyboard Kit keeps your keyboard spotless. Includes one ounce of cleaning solvent, eight keyboard swabs, and four ounces of Office Duster Jr.™ compressed air.
Kleen Keyboard Kit. *41019* - $10

I. Fine Art For Your Mac II
Finally the perfect power control center for your Mac II. Masterpiece organizes your power cords with a special computer outlet, four individually switched peripheral outlets and one convenient master switch. Surge suppression and noise control protect your entire system, and a separate filter protects your modem data from electrical disturbances on the phone line. And if all of this isn't enough, Masterpiece also has a built-in swivel base for adjusting your monitor to that perfect position.
Masterpiece Mac II. *26893* - $103

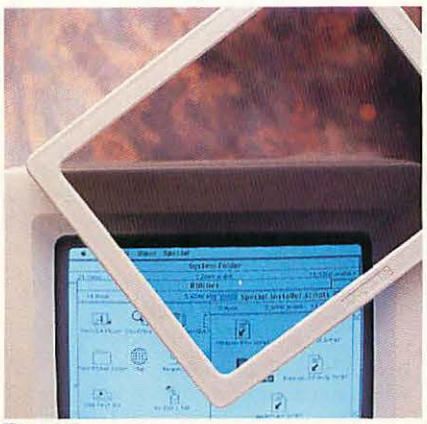
Keep Your Mac From Wandering
The Kensington Security Kit tethers your Mac CPU, monitor, and keyboard so they stay where you put them using Apple's built-in security slots. The kit's unique screwdriver and tamper-resistant screws will lock up peripherals, too. Also fits Apple II GS.
Kensington Security Kit. *26884* - $33

Extra Long ADB Cable. *26900* - $24

• *Same day shipment.*



A *26898*



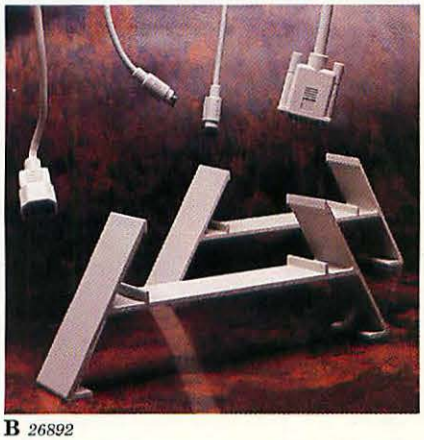
D *26882*





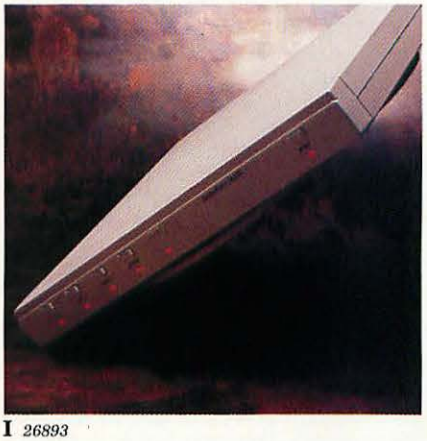


H *41023,41019*

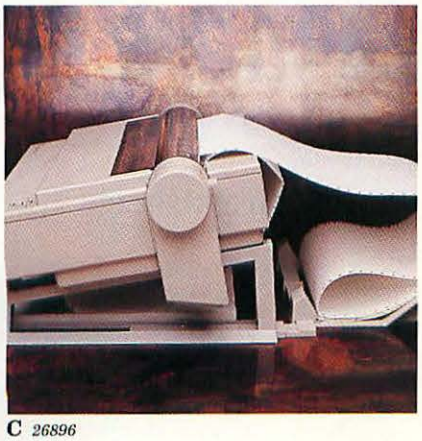


B *26892*

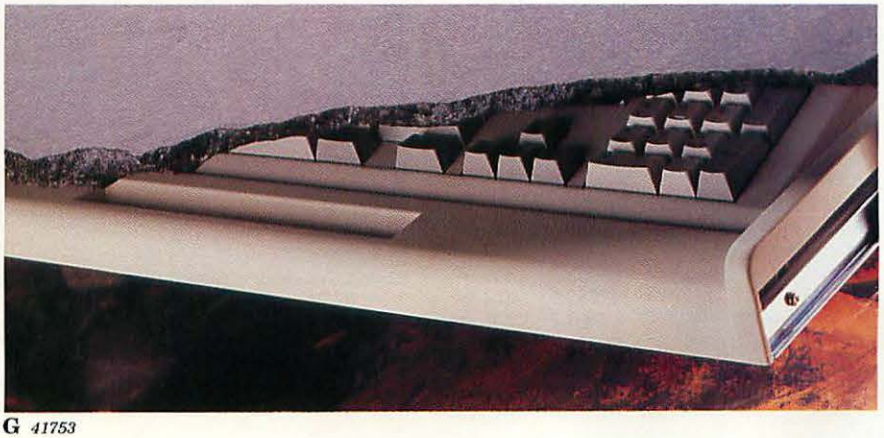
E *41600,41601*



I *26893*



C *26896*

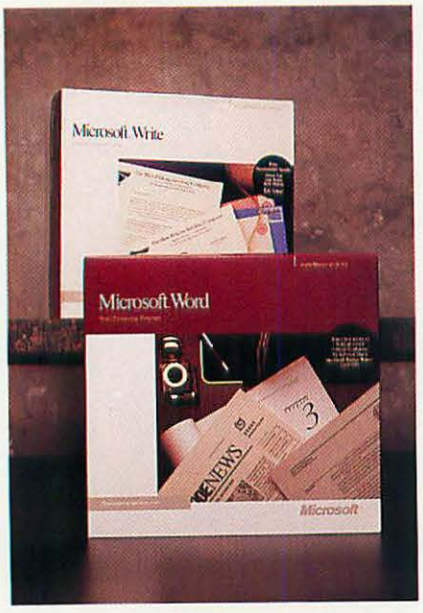


G *41753*

Mac Avenue
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Software — *FASTER*

Word Processing



Process Ideas
When it's time to move beyond the realm of word processing into the realm of idea processing, it's time to get Microsoft Word 4.0. With Word, you can design a newsletter from start to finish, create tables without worrying about tabs, and flow type around imported graphics. Cruise through longer documents with the table of contents generator and full indexing capability. With Word 4.0 you can also customize menus and design style sheets to fit your exact needs.

A Junior Partner
If it's just words that make your business, you can get to work super-fast with Write, Microsoft's simple word-processing program that gives you multiple columns, an 80,000-word dictionary, and the ability to put graphics in your text. So simple and so inexpensive you can pick it up in an afternoon.

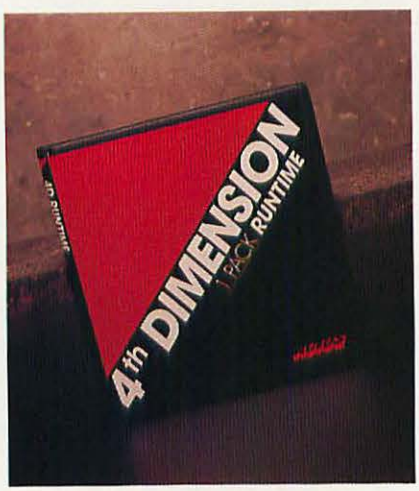
Microsoft Word.	*30582* -	$245.00
Microsoft Write.	*30584* -	$77.00
AccuText	*30608* -	$543.00
Acta Advantage	*30606* -	$63.00
Big Thesaurus 1.0	*30618* -	$57.00
Findswell	*30594* -	$35.00
FullWrite Professional	*30600* -	$253.00
Micrsoft Word	*30582* -	$245.00
Microsoft Works	*30580* -	$177.00
Microsoft Write	*30584* -	$77.00
MindWrite	*30612* -	$91.00
MindWrite Express	*30614* -	$95.00
More II	*30604* -	$243.00
Nisus	*30602* -	$236.00
OmniPage 2.0	*30610* -	$545.00
QuickLetter	*30598* -	$72.00
Spelling Coach Pro 3.1	*30620* -	$112.00
Spellswell	*30596* -	$44.00
WordFinder 2.0	*30622* -	$31.00
WordPerfect Mac	*30590* -	$183.00
WriteNow	*30588* -	$107.00

Database

Into A New Dimension
When you depend on data to keep your business going, your relational database must give you all the power you need — even as your database doubles and triples. If your business is moving in this direction, buy 4th Dimension. 4th Dimension gives you the power and flexibility you need to get the most mileage out of your data. 4th Dimension can create forms, detailed reports, and mailing labels, and can communicate with other machines — all from within the Macintosh interface you already know.

And, when it's time to develop serious, special applications for the power of 4th Dimension, 4th Dimension Runtime gives you more power for your program needs.

4th Dimension.	*27780* -	$463.00
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Data Desk Professional	*27818* -	$286.00
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dBASE Mac/Runtime	*27802* -	$569.00
Double Helix	*27804* -	$327.00
FoxBase II	*27790* -	$292.00
FoxBase II Runtime	*27792* -	$176.00
FoxBase MultiUser	*27794* -	$385.00
FoxBase MultiUser Runtime	*27796* -	$293.00
Microsoft File	*27798* -	$123.00

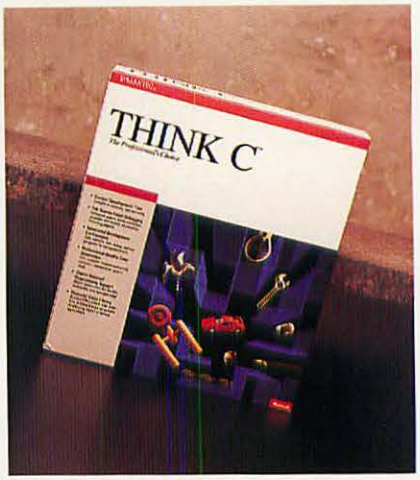


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I Think, Therefore I Program
Flash from concept to product in the blink of an eye. With Think C's fast compiler and linker, programming time shrinks to no time. Devise new applications, DAs, INITs, drivers, or HyperCard functions in this powerful but flexible programming environment. Whether you choose object-oriented programming or procedural programming, Think C will help you build and manage your program with maximum efficiency.

Think C. *27586* - $149.00



Just Enough Pascal	*27582* -	$46.00
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Prototyper	*27588* -	$183.00
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Think C	*27586* -	$149.00
THINK Pascal 2.0	*27584* -	$160.00
True BASIC	*27594* -	$79.00
Turbo Pascal	*27592* -	$67.00

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BulkMailer 3.3	*27812* -	$76.00
BulkMailer Plus	*27814* -	$187.00
KeyPlan	*27810* -	$243.00
Microsoft Office Bundle	*30182* -	$525.00
Paracomp Milo	*27806* -	$156.00
ProVue Panorama	*27808* -	$197.00

Spreadsheets

Caught In The Crunch
Number crunching used to be dull business, but Wingz makes spreadsheets come alive. Folks who expect spreadsheet programs to handle columns of numbers will love Wingz—it moves numeric mountains! And, as the first graphic spreadsheet, Wingz can also generate

• *$2 overnight delivery!*

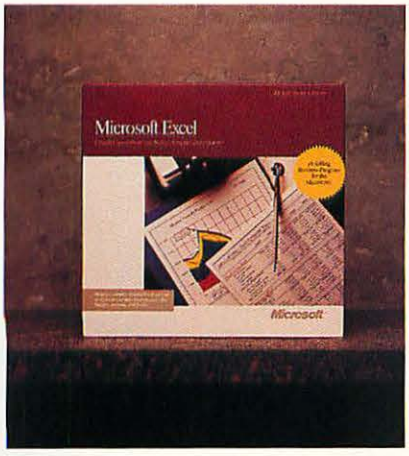
Than A Speeding Pencil...

dynamic graphs and charts — quickly and in 3-D. Use drawing tools from the Wingz toolbox to combine illustrations and clip art into attention-getting reports and presentations. Then resize text fields to add power to the explanations for your figures. Who says numbers have to be dull?

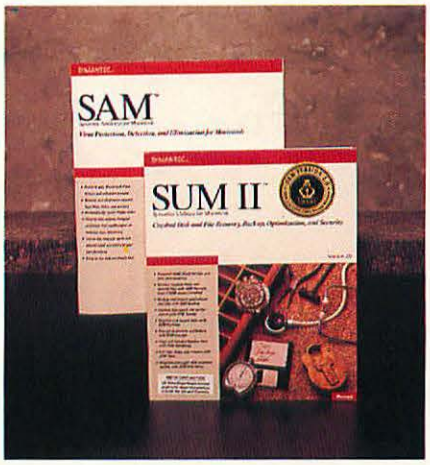


Wingz. *30184* - $245.00
Full Impact *30186* - $245.00

You Too, Can Excel
Microsoft Excel provides users the power of a fast-moving spreadsheet while it blasts through mountains of data with rocket-speed. Combine the spreadsheet and database with an array of 42 charts, and you have business graphics that will make heads turn at your next presentation. With the built-in macro language you can automate complex, repetitive tasks. And this is just the beginning! Excel also handles complicated scientific, financial, and mathematical functions, supports color display and output, and lets you work on several spreadsheets at once. It's a powerhouse!
Microsoft Excel. *30180* - $245.00

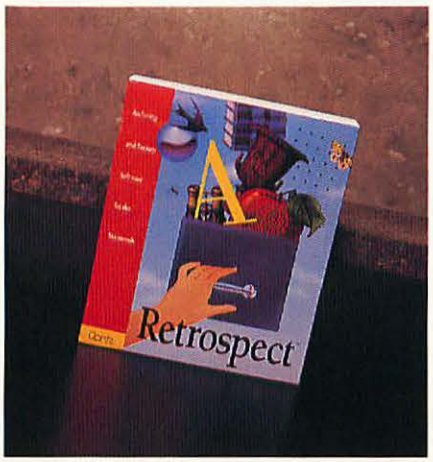


Utilities



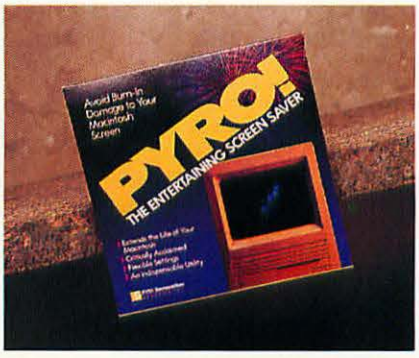
Play It Again, SAM (and Sum)
Stop a hideous virus before it starts with Symantec's AntiVirus for the Macintosh (SAM). On-line help takes the guesswork out of scanning suspicious files or folders. When SAM detects any viral activity inside your Mac, it deletes the deviant code immediately.

Sleep peacefully, knowing your data is safe, with the help of SAM's brother, Sum II, Symantec's Utilities for the Macintosh. Sum II maintains dependable backups, recovers lost data, guards against crash damage, and secures your hard drive from spies.
SAM. *30342* - $63.00
Sum II. *30340* - $92.00



Have You Backed-Up Lately?
Keep backup and archive files in perfect order. With full LocalTalk network capability, Retrospect handles large storage devices, too, including optical, tape, and high-capacity hard drives. Organize your filing system the way you've always dreamed of with Retrospect.
Retrospect. *30384* - $152.00

Born On The Fourth Of July
Enjoy safe fireworks and a safe screen. Pyro! prevents phosphor burnout by replacing your screen image with random visual pyrotechnics.
Pyro. *30398* - $14.00



101 Scripts & Buttons	*30426* -	$35.00
Affinifile	*30350* -	$44.00
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Calendar Maker	*30358* -	$30.00
CanOpener	*30348* -	$63.00
ClipShare 1.0	*30430* -	$138.00
Complete Undelete	*30420* -	$36.00
Copy II Mac	*30362* -	$20.00
DiskExpress II 2.0	*30422* -	$54.00
DiskFit	*30392* -	$58.00
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DiskTools Plus	*30410* -	$31.00
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The Night Watch	*30368* -	$85.00
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Virex	*30412* -	$51.00
XTree Mac	*30344* -	$50.00

More Powerful Than A

Communications

The Mail Must Go Through
Install Microsoft Mail in your office and watch communication and productivity improve exponentially! Brainstorm without the meeting, work as a group with no shouting. With Mail you can massage a document, attach a message or a memo, and pass both to your co-creatives for revision without ever touching paper. For accounting or purchasing, you can add custom forms via Mail's HyperCard formbuilder. AppleShare- and TOPS-compatible, Mail uses the LocalTalk network and can serve multi-vendor networks including VAX and PC networks.

Microsoft Mail/Server powers the electronic mail service, stores messages, and allows the network manager to add or delete users and alter network parameters with ease.

Microsoft Mail - Workstation. *27676* - $83.00
Microsoft Mail - Server. *27678* - $246.00
Microsoft Mail 20 Pack. *27680* - $965.00



Carbon Copy Mac	*27708* -	$119.00
CompuServe Info Service	*27702* -	$23.00
CompuServe Navigator	*27704* -	$38.00
Connect	*27706* -	$93.00
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Dow-Jones News/Retrieval and Membership	*27670* -	$23.00
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InBox Starter	*27688* -	$143.00
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In/Out 10-User	*27700* -	$187.00
LapLink 2.0	*27710* -	$85.00
Microphone II	*27660* -	$213.00
Microsoft Mail - Workstation	*27676* -	$83.00
Microsoft Mail - Server	*27678* -	$246.00
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Quickmail 10 Pack	*27696* -	$246.00
Quickmail 5-User	*27694* -	$165.00
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SmartComII	*27662* -	$84.00
Timbucktu 3.0	*27666* -	$95.00
Timbucktu Remote	*27668* -	$123.00
TOPS for DOS 2.1	*27684* -	$98.00
TOPS for the Macintosh	*27682* -	$188.00
TrafficWatch	*27674* -	$127.00
White Knight	*27664* -	$87.00

Money Management

101 Macros for Excel	*28476* -	$35.00
Business Sense	*28466* -	$265.00
Checkwriter	*28468* -	$35.00
Dollars & Sense	*28464* -	$78.00
Easy Light MAC	*28474* -	$41.00
Insight AR	*28442* -	$395.00
Insight AP	*28440* -	$395.00
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Insight Inventory	*28446* -	$395.00
Insight Payroll	*28448* -	$395.00
Insight Time Bill	*28450* -	$395.00
MacMoney 3.5	*28478* -	$58.00
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Bypass painful bookkeeping chores with Quicken, the helpful money management program that costs you less than an hour with an accountant. Keep tabs on your expenses, watch the bottom line of your small business, and track your personal income — simply and easily, and all at the same time. Quicken writes and addresses checks, reconciles your bank statement, and lets you know where you are with the budget. Save yourself the monthly headache. Get Quicken!
Quicken. *28458* - $35.00



Scheduling



MORE For Your Money
No detail is too small — or too monumental — for MORE II. Juggle several major projects at once. MORE II offers users word processing, outlining, and slide generation as well as handouts for clients. Includes tools to create graphs and charts in color for overheads and printed material. Take your Mac along to impress the crowd with a MORE-II generated, self-running presentation to make MORE of an impression yourself.
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C.A.T.	*29742* -	$225.00
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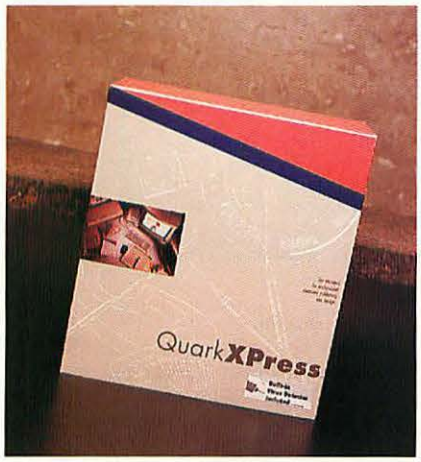
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Adobe Illustrator 88	*29788* -	$275.00
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Publish-It	*29822* -	$223.00
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Silicon Press	*29796* -	$51.00
Springboard Publisher	*29814* -	$107.00
Top Honors	*29812* -	$57.00

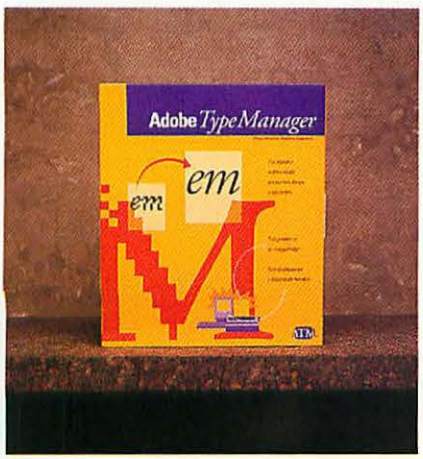
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To get into a publishing environment where you have the power and control you want, grab a ticket on the Quark XPress. XPress gives you exact control over line spacing, kerning, and word spacing. Import text from almost any word-processing program and graphics from any format. Ready for color? Quark makes color separations and uses the Pantone Match System to give you a 16 million-color palette for spot color. And, unlike other desktop publishing systems, Quark gives you both an 80,000 word dictionary for spell checking and a "Search-and-Replace" feature.
Quark XPress 2.11. *29802* - $455.00



Beyond The Jagged Edge
Banish forever jagged edges on the bit-mapped letters of your screen fonts!! Adobe TypeManager gives you the smooth-edged look of PostScript type while it dramatically improves the output of your non-postscript printer. By eliminating the need to store several sizes of each font, TypeManager preserves valuable storage capacity on your hard drive.
Adobe TypeManager. *29824* - $55.00



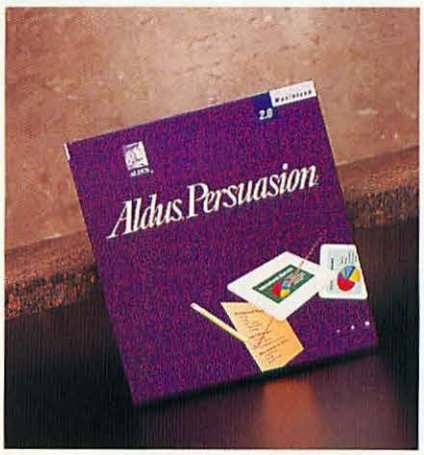


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Publish anything — newsletters, books, magazines, even box tops! Documents of any length are a piece of cake with Aldus PageMaker. Imports all sorts of graphics files, kerns type, changes leading, and wraps text manually or automatically around irregular images. Get started yourself in a hurry by using the program's pre-formatted templates, or put PageMaker in the hands of a graphics genius and — *voila* — you'll have your own printed masterpiece. PageMaker supports color and accepts almost all word-processing files.
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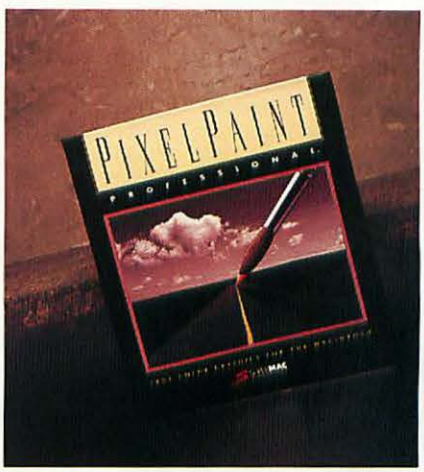
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Click Art Christian	*29256* -	$34.00
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DeltaGraph	*29260* -	$97.00
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Dreams	*29238* -	$263.00
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Macromind Director	*29216* -	$445.00
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PixelPaint Professional	*29230* -	$393.00
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Smart Art 2	*29248* -	$83.00
Smart Art 3	*29250* -	$83.00
Super3D	*29226* -	$313.00
SuperPaint	*29222* -	$124.00
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Able To *LEAP* Through



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Enjoy the flexibility of object-oriented graphics together with the detail of bitmap painting with Cricket Paint. Any shape, line or texture can be immediately incorporated into your illustration—without the confusion of different layers. Paint outputs in a broad range of formats to almost any printer.

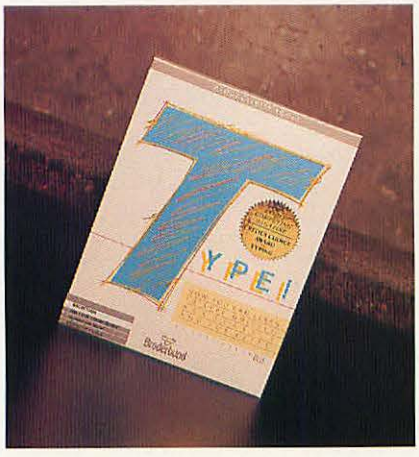
Cricket Draw. *29234* - $136.00
Cricket Paint. *29236* - $176.00

Education

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KidsTime	*27988* -	$24.00
KidTalk	*27980* -	$31.00
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Unicorn Animal Kingdom	*27948* -	$26.00
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Type! *27958* - $17.00

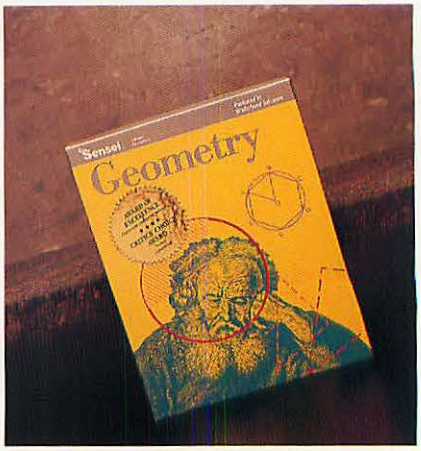


Have Fun While You Learn
If you are dragging — one-word-at-a-time — through your reading, get a copy of Speed Reader II to increase both reading speed and comprehension in six easy lessons. You will stop wasting time by training your eyes to move more efficiently across a page. Speed Reader II lets you chart your progress with a selection of graphs so you can watch yourself improve.

If someone you know needs a little help with math skills, offer some fun with Math Blaster Mystery, a problem-solving game that covers percents, interest, fractions, and pre-algebra. Designed by teachers and tested in classrooms, Math Blaster Mystery also develops inductive and deductive reasoning skills while the user solves a mystery.
(P.S. *Both Speed Reader II and Math Blaster Mystery are good for adults as well as for kids.*)
Math Blaster Mystery. *27970* - $25.00
Speed Reader II. *27972* - $25.00



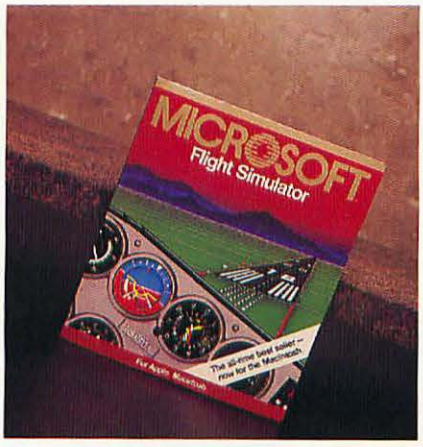
Love Triangles
If you've given up on learning the difference between an equilateral and an isosceles, or if the acute angle has finally gotten obtuse, check out Geometry — the program. Geometry is the educational program that can make triangles into friends again. Geometry clarifies abstract concepts through the use of interactive animation. And it won't leave you in the dark when you need a pointer either, because Geometry provides references, explanations, and answers to every problem it poses.
Broderbund Geometry. *27962* - $57.00



Tasks To Really Astound!

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Hardball	*28688* -	$25.00
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King's Quest 1	*28724* -	$28.00
King's Quest 2	*28726* -	$28.00
King's Quest 3	*28728* -	$28.00
King's Quest 4	*28736* -	$28.00
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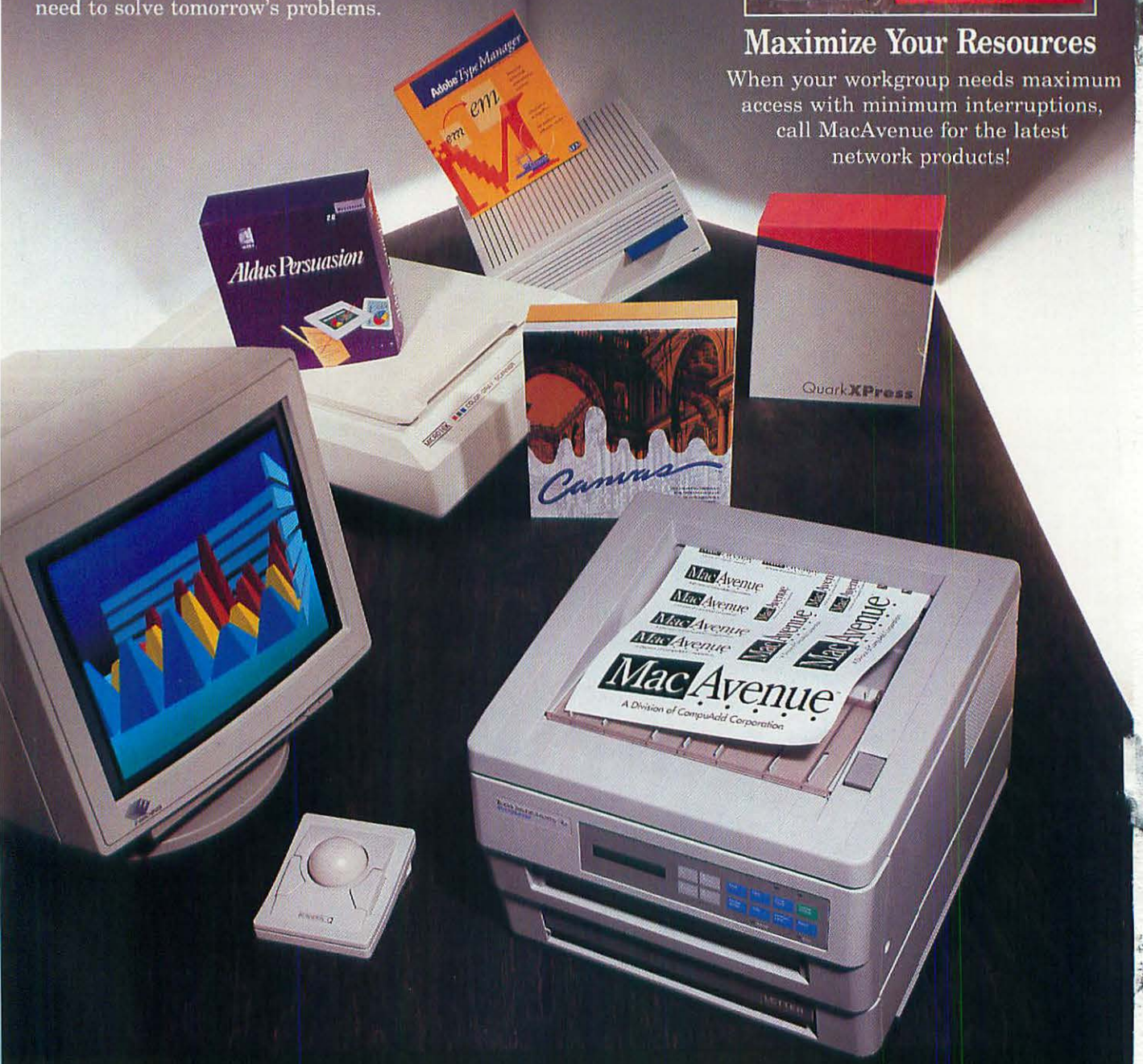
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Harmonic Convergence

APPLE IS HEADED IN THE RIGHT DIRECTION

BY BRUCE F. WEBSTER

Imagine the following. You sit down at what appears to be a regular Mac II or IIx. You boot up and log on to A/UX, which now gives you MultiFinder as a user interface. You load and run regular, unmodified Mac applications and freely swap files between your UNIX file system and the Macintosh system partitions on your hard disk. (If you don't want A/UX, you can boot up the regular Mac Operating System, which also gives you MultiFinder.) Your entire system is running about twice as fast as a Mac IIci. You also have a 24-bit color display (on an Apple 13-inch RGB monitor) running faster than the IIci's 8-bit display; if you switch to 8 bits per pixel, you find your graphics operations running anywhere from 5 to 30 times faster than on the IIci. Choosing size over color, you power down, unplug the 13-inch monitor, plug in an Apple Two-Page Monochrome monitor, and power back up, giving yourself a large (1152 by 870 pixels) 8-bit gray-scale display that's still much faster than the IIci's display.

Sound a bit fantastic? Well, all the products will have been announced by the time you read this, and the system described above should be a reality by mid-to-late summer. The system actually represents Apple announcements in three product areas: the IIfx, a new high-end Mac; new graphics boards; and A/UX 2.0. Let's take at look at the technological and marketing significance of each.

The Macintosh IIfx

The IIfx represents the first big jump in system performance—and the first major change in system architecture—since the release of the Mac II three years before. Comparing the IIfx with the rest of the Macintosh family, you can see how dramatic the changes are from the low end to the high end (see "Macintosh Architectures").

Anybody can crank up the CPU's clock rate, and some vendors have done that already. For example, DayStar Digital offers a line of accelerators for the (discontinued) Mac II and the Mac IIx, as does SiClone (see "Pushing the Mac II Performance Envelope", *Macworld,* February 1990). These boards give you a 68030 CPU (with an optional 68882 FPU) running at speeds ranging from 25MHz to 50MHz, at prices ranging from $2500 to more than $7000.

But spending all that money doesn't buy you much if the CPU just spends more clock cycles waiting for data or moving every bit around. Existing accelerator boards must work within the constraints of the Mac II/IIx architecture, resulting in diminishing returns. I don't have benchmarks making a direct comparison; Apple claims, however, that a IIfx (running at just 40MHz) would outperform a IIx with a 50MHz accelerator board.

Forms of Enhancement

How could Apple achieve this increased performance? By unshackling the CPU with enhanced memory access, independent I/O processing, and



a division of the system-board architecture into fast and slow buses.

The IIfx engineers used a twofold approach to improve memory-access performance. First, they put in a 32K, high-speed cache as a standard feature (it was optional on the IIci). This guarantees the performance boost of the cache to every IIfx owner. Second, they redesigned the main memory access subsystem to grab memory-write operations (freeing up the CPU more quickly) and to allow overlapping read and write operations. That last change didn't come free and required that Apple design a new type of SIMM, which will be scarce and likely expensive for quite a while.

The lack of direct memory access (DMA) technology on the Macintosh has long been a sore point for many users. The CPU is forced to move every byte in and out of memory, handling all transfers to and from storage devices and I/O ports. This bogs down performance and leaves a high-powered CPU spinning cycles, waiting to push along the next byte. With the IIfx, Apple has started to address that

(continues)

concern, though it still has a long way to go. The SCSI controller chip has been redesigned and expanded to include DMA support of SCSI devices. Likewise, the IIfx has two I/O Processors (IOPs) to ease the CPU's burden of handling I/O through the serial ports, the Apple Desktop Bus (ADB) ports, and the floppy drives.

This is a good start but not a finished solution; in fact, it's really just laying the groundwork for future enhancements. As it turns out, the current Mac Operating System can't take advantage of the SCSI DMA or I/O Processor chips, because it isn't set up to handle asynchronous I/O (that is, to have the CPU initiate a transfer and then continue program execution while the transfer takes place). Apple engineers I spoke to implied that future versions of the Mac OS would be able to do this, but they wouldn't say which ones or when. Also, Apple's approach is a bit halfhearted. For example, the company hasn't addressed the use of I/O processors for memory-to-NuBus and memory-to-memory transfers; in those situations the CPU still has to move every byte. Still, the DMA and IOP additions represent an important (and overdue) first step in the right direction.

The third change made to improve performance was to separate the IIfx system architecture into two buses. The fast bus runs at 40MHz and includes the CPU, the cache, the memory controller, main memory, and ROM. The slow bus runs at 20MHz and includes the NuBus, all I/O devices, and the 68882 FPU. This setup allows the CPU to run at full speed most of the time, slowing down only when it has to directly involve itself with I/O. The result is faster performance and an architecture that should simplify future system-board redesigns to accommodate still-faster clock speeds and different processors (such as the 68040, or even a RISC chip of some sort).

Performance Costs

At this writing, pricing on the IIfx is still uncertain; Apple quoted me a price range of $10,000 to $12,000 for a fully configured system. That includes memory and mass storage; it probably doesn't include keyboard, video board, or monitor, so you can add another $1000 to $5000, depending upon what kind of display you choose. Prices for the new SIMMs are also undecided but are likely to be at least the same as current SIMM prices from Apple, if not higher. In short, this is not a system for the faint of wallet.

Are people willing to pay between $13,000 and $20,000 for a high-end, high-powered Mac? Most likely, if the market for high-priced accelerator boards is any indication. John Sculley has stated that Apple sees its future in the midlevel and high-end markets; the IIfx engineers hinted that there were yet faster systems already being developed. But this puts Apple in direct competition with midlevel systems from Sun, HP/Apollo, DEC, Next, and others. That's a tougher, smaller marketplace more concerned about performance than ease-of-use; Apple may need those faster systems sooner than it thinks.

(continues)

MACINTOSH ARCHITECTURES

Model	CPU	FPU	PMMU	Other Features
Mac 128K, 512K, Plus, SE	8MHz 68000			
Mac Portable	16MHz 68000			
Mac II	16MHz 68020	68881	optional (68851)	
Mac IIx, SE/30, IIcx	16MHz 68030	68882	yes	
Mac IIci	25MHz 68030	68882	yes	optional cache
Mac IIfx	40MHz 68030	68882	yes	built-in cache, SCSI DMA, I/O processors

Basic performance architecture of the Macintosh family. The Paged Memory Management Unit (PMMU) for the 68030-based systems is built into the 68030 chip itself.

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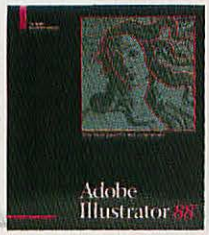
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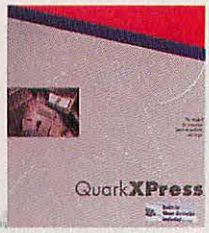
PUZZLES FOR PROGRAMMERS, #1.

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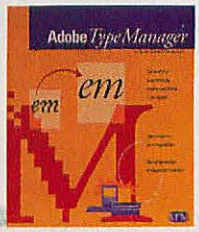

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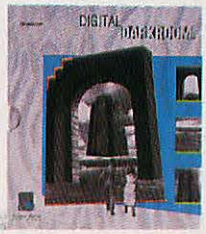
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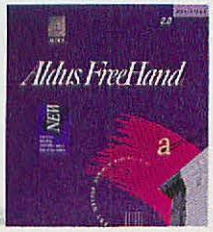

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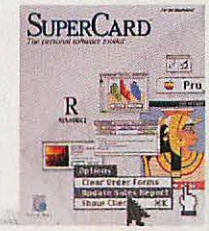
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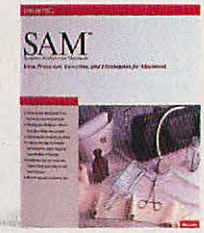
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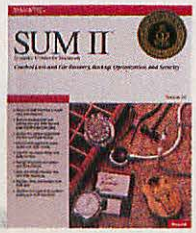

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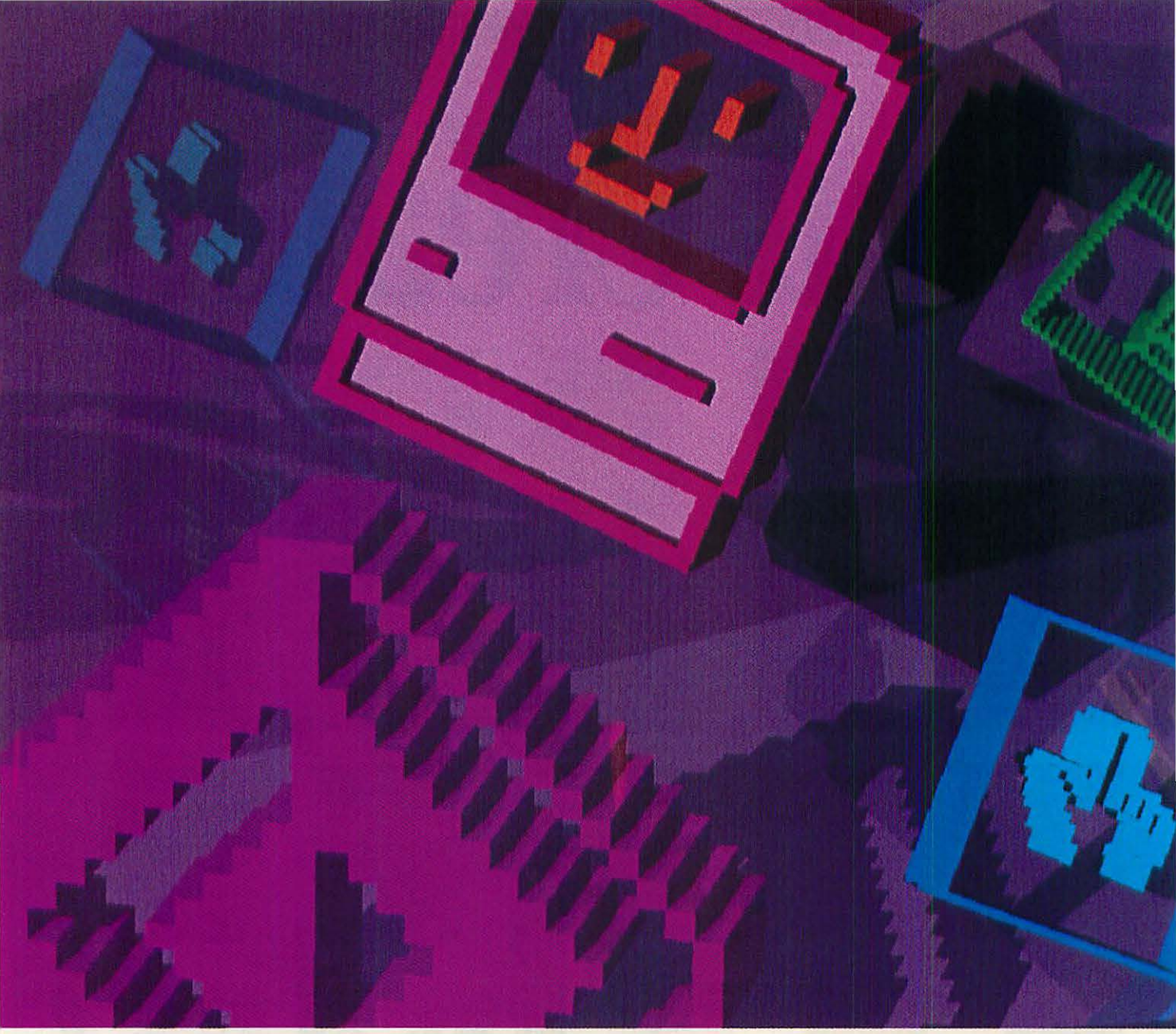
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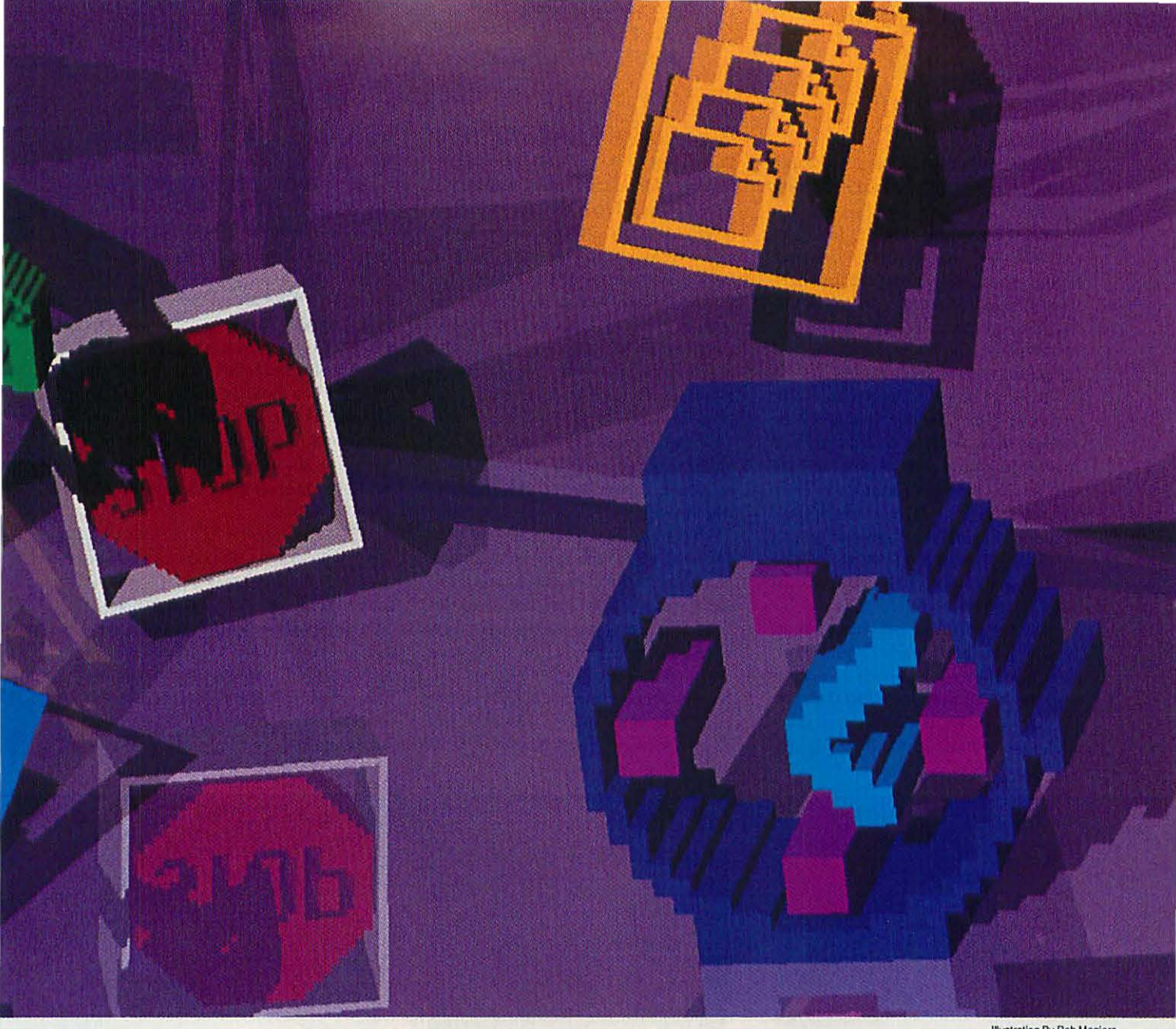


Illustration By Rob Magiera

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24-Bit Reigns

The Macintosh Display Card 8•24 and the Macintosh Display Card 8•24 GC, the new 24-bit graphics boards announced by Apple, aren't as flashy as the IIfx. But with lower prices and higher resolution and performance, they'll have a broader and more immediate impact on the Macintosh marketplace. Apple's goal: establish 24-bit color as the Mac standard.

Now, 24-bit video boards are nothing new: SuperMac, Radius, and RasterOps have all had boards on the market for some time, and SuperMac and Radius have accelerators as well. But the 8•24 and GC represent Apple's first real venture into high-end graphics displays, and a long-overdue move toward graphics acceleration (one issue not addressed by the IIfx).

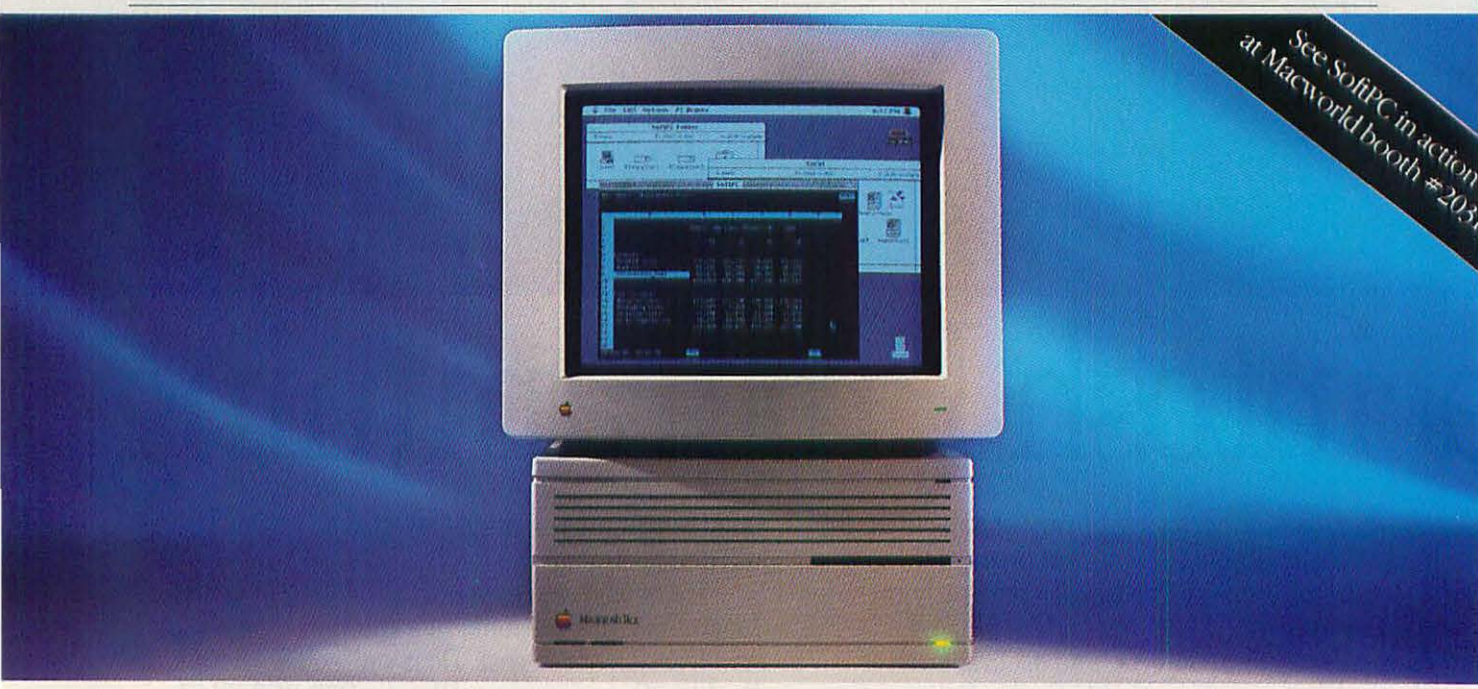
The 8•24 can be purchased as an 8-bit board (Macintosh Display Card 4•8) and then upgraded to 24 bits, or you can buy it fully configured for 24-bit color. The GC is a 24-bit board that includes an AMD 29000 RISC processor and software to patch QuickDraw. The result is better graphics performance, with certain functions running 5 to 30 times faster than on an unaccelerated board. What's more, Apple says a GC board will increase graphics performance of any other video boards in your system. And since all acceleration is done in software, Apple has the freedom to upgrade or modify the acceleration; the engineers said Apple would come up with accelerator support for the X-Window system (for A/UX). Both boards detect, identify, and adapt to all of Apple's Mac monitors, as well as to any third-party monitors that provide the proper sense signal.

Technical features aside, two factors make this announcement significant. First, Apple has said it intends to phase out all its existing graphics boards (except the inexpensive 1-bit monochrome board) and replace them with the 4•8, 8•24, and GC boards. Second, the pricing is very low, especially for Apple, which is not known for low prices. The 8-bit 8•24 will be about $700, close to the price for Apple's current 8-bit board. The 24-bit 8•24 will cost about $1000 and the GC will be about $2100.

The Macintosh Display Card 8•24 is more expensive than RasterOps' ColorBoard 264 (which costs $795), but both the 8•24 and the GC cost far less than the SuperMac Spectrum/24 ($4499 with accelerator) or the Radius DirectColor/24 ($4095). The SuperMac and Radius boards require you to spend $5000 to $8000 for a 24-bit color display; Apple will now get you in the door for about $2000 (an 8•24 with an Apple 13-inch RGB high-resolution monitor).

The combined effect of all this will be to establish 24-bit color as a Macintosh standard. Apple's low prices will put a great deal of downward pressure on third-party firms, making high-quality color more affordable for everyone. And Apple's plans to phase out virtually all other video boards will encourage software developers to

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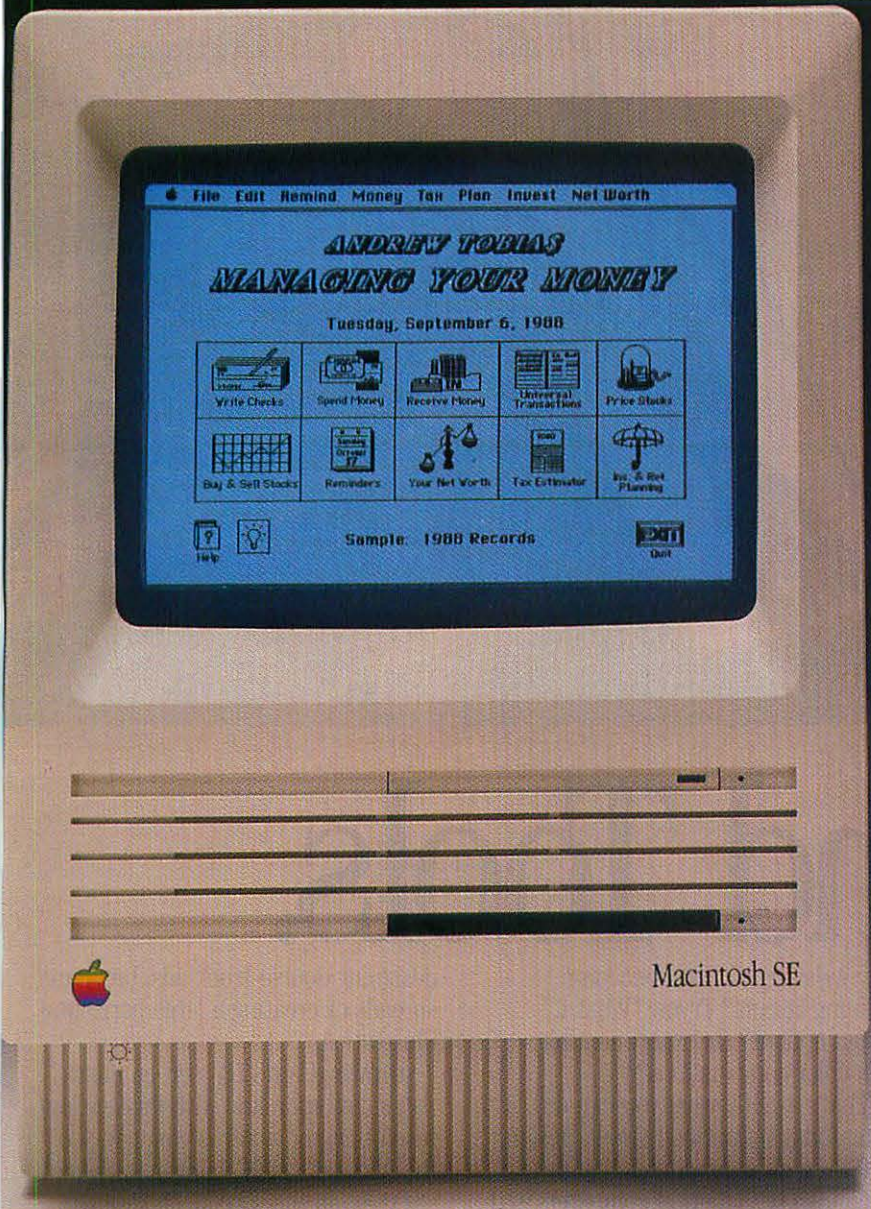
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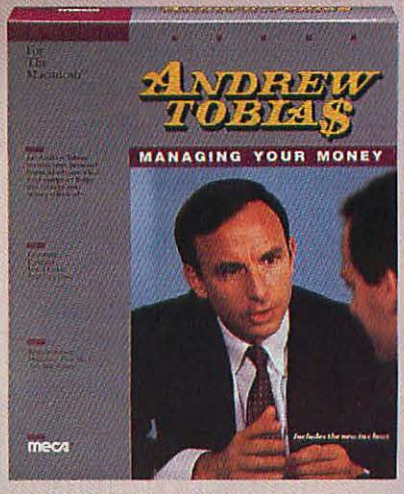
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Apple sees its graphics technology as a significant advantage over its competitors, and rightly so. No one else has the tremendous flexibility found in the Mac hardware and software: the ability to have multiple monitors of varying resolution and pixel depth forming a single, contiguous desktop, and then to have almost all application software automatically support such configurations, even if they change dynamically while the applications are running. By contrast, the available graphics technology in the MS-DOS world is primitive, rigid, and frustrating for both developers and end users. Apple's efforts to raise its own standards will help its developers and end users and, in the end, itself.

A/UX 2.0

A/UX—Apple's version of UNIX for the Macintosh—has been something of a joke in the Mac community for the last few years. While it is valuable to Apple as a check-off item for federal contracts, A/UX has converted few UNIX hackers to the Mac or vice versa.

Laugh no more. With version 2.0, Apple has made A/UX a reasonable alternative to the Macintosh OS and a more attractive product to both the Mac and UNIX communities. The big change: Apple now has a version of MultiFinder that runs as a separate task under A/UX, giving A/UX the standard Mac interface. You can also run any 32-bit clean Mac application under A/UX without modification. What's more, Apple is providing dialog-box interfaces for all the standard UNIX commands (grep, ls, ps, and so on), much along the lines of the Commando versions of MPW commands. And you can directly access files and applications on Macintosh floppies and hard disk partitions. All of this sits on top of what appears to be a very complete UNIX implementation (AT&T System V, Release 2, Version 2 with BSD 4.3 extensions) that will also include the X-Window System for UNIX applications that support X.

Preemptive Strikeout

It's tempting to say that you get the best of both worlds with A/UX 2.0, but that's not quite true: you still don't get preemptive (true) multitasking of Mac programs. That's because MultiFinder runs as a single task, and all Mac applications and utilities run under MultiFinder and are limited to regular MultiFinder behavior.

When that issue was raised at the product preview I attended, former Apple Products president Jean-Louis Gassée pooh-poohed the idea of preemptive multitasking on personal computers, citing potential problems with mouse-cursor behavior and with music-based applications. Jean-Louis might do well to sit down with a Next system, which has few problems with either, and which, contrary to the claims of the A/UX 2.0 product manager, has the best UNIX graphical interface around. For that matter, he might go out and get an Amiga 500, which provides preemptive multi-

(continues)

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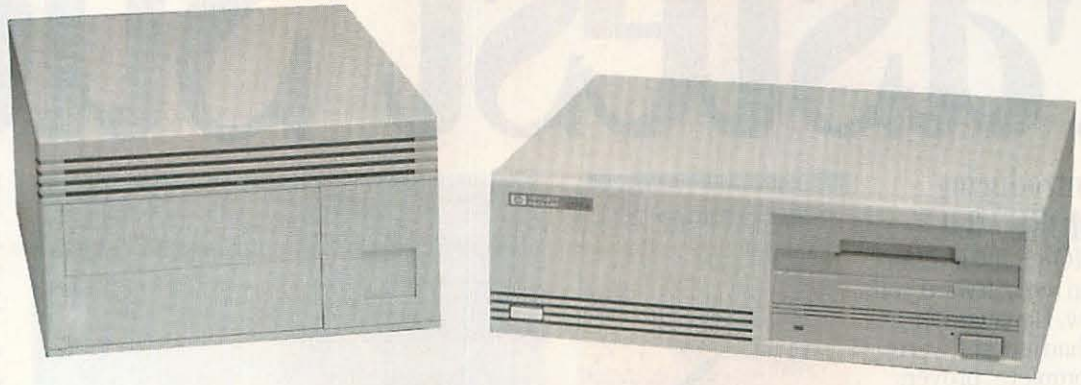
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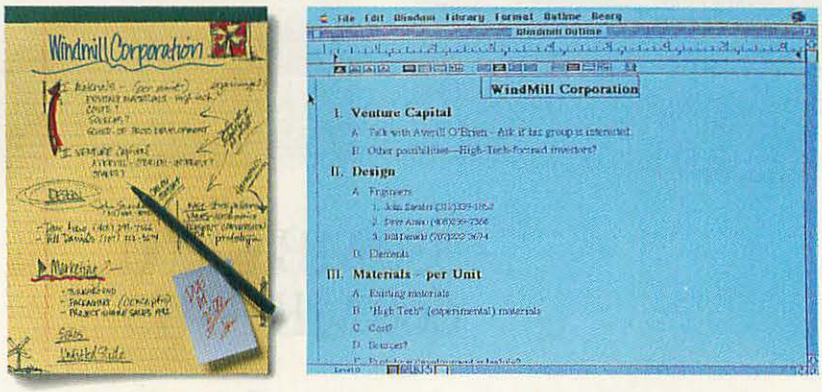
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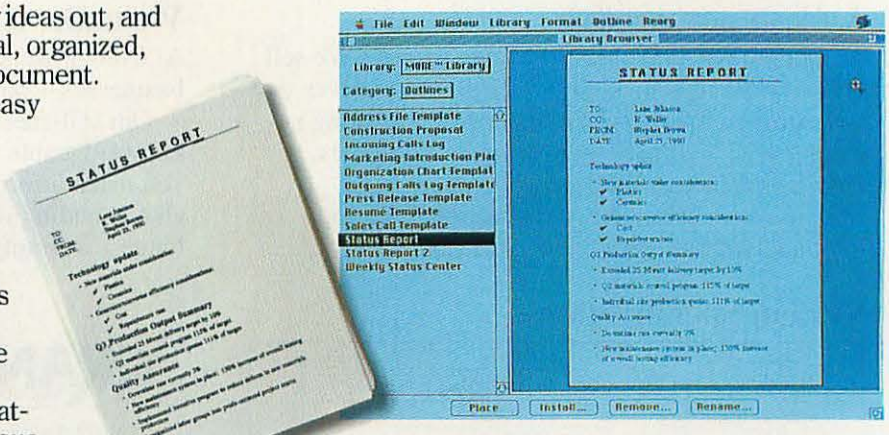
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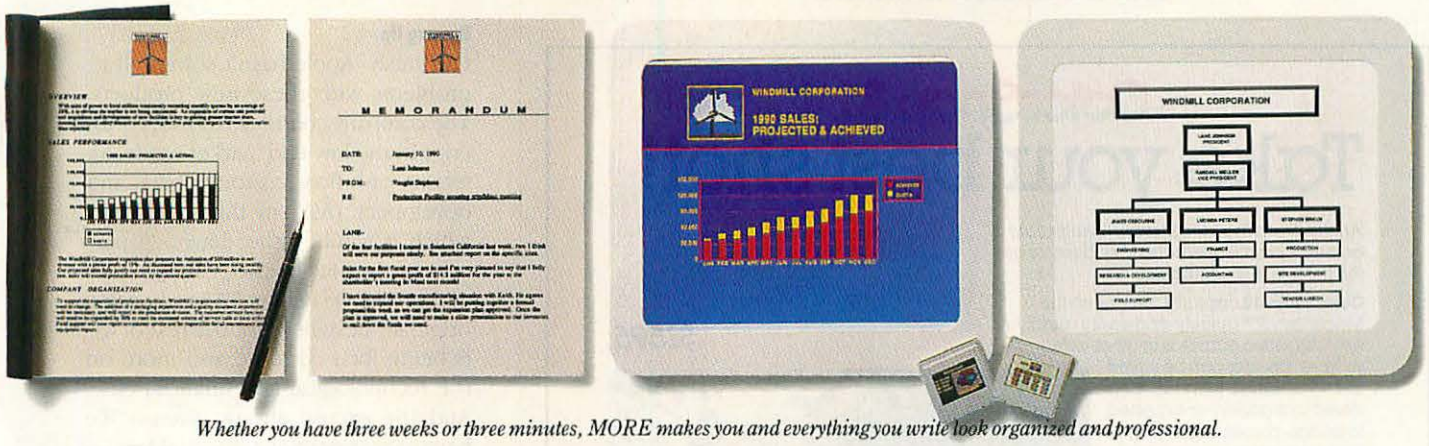
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tasking on an under-$1000 personal computer that's used heavily for entertainment and multimedia applications. One gets the feeling that the fox, finding the grapes too much trouble to get to, has decided that they're sour and so not worthwhile.

Ironically, it's this very lack of preemptive multitasking that prevents the Mac OS from benefiting from the DMA and I/O processing offered by the IIfx; likewise, it's A/UX's multitasking that lets it take advantage of the same. Perhaps more significant, though, are the expectations of the high-end users that Apple is targeting. These folks know, understand, and are accustomed to true multitasking. They will probably demand it as a standard feature and will not be won over by Apple's weak and semantic arguments.

Those issues aside, the Mac-UNIX marriage holds promise. Although A/UX 2.0 was treated as the least interesting of the three products at the press preview, it may well turn out to be the most important.

Coming Up

Obviously, Apple hasn't solved all its problems with these new products. The company continues to let its presence in the low-end market erode, affecting cash flow, customer base, and developers. (Ask any third-party firm which it would rather have: 20 percent of the Mac market, or 2 percent of the MS-DOS market.) A product line originally designed "for the rest of us" is being focused more and more on the technological and financial elite. And the excuse always given—"We have to answer to our shareholders"—is less convincing in light of slow sales and declining profits.

Still, Apple seems to have some self-confidence again. As one of the IIfx engineers put it, "With this announcement, we feel that once again we are the technological leaders." Whether or not that's true remains to be seen, but Apple is certainly heading in the right direction. ■

Contributing editor Bruce F. Webster is project manager at San Diego-based LaserGo. He can be reached on BIX (as bwebster) and on MCI Mail (as Bruce Webster).

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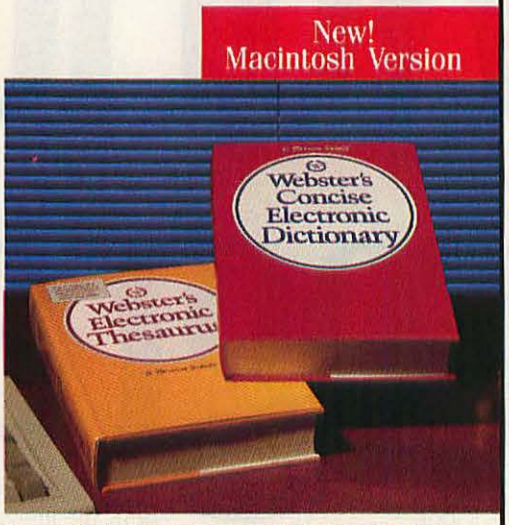
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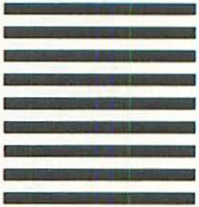


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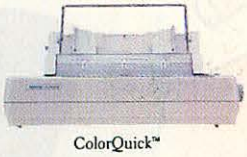
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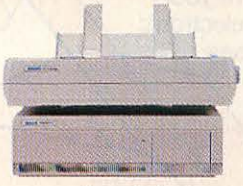


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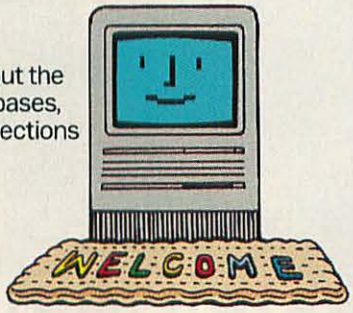


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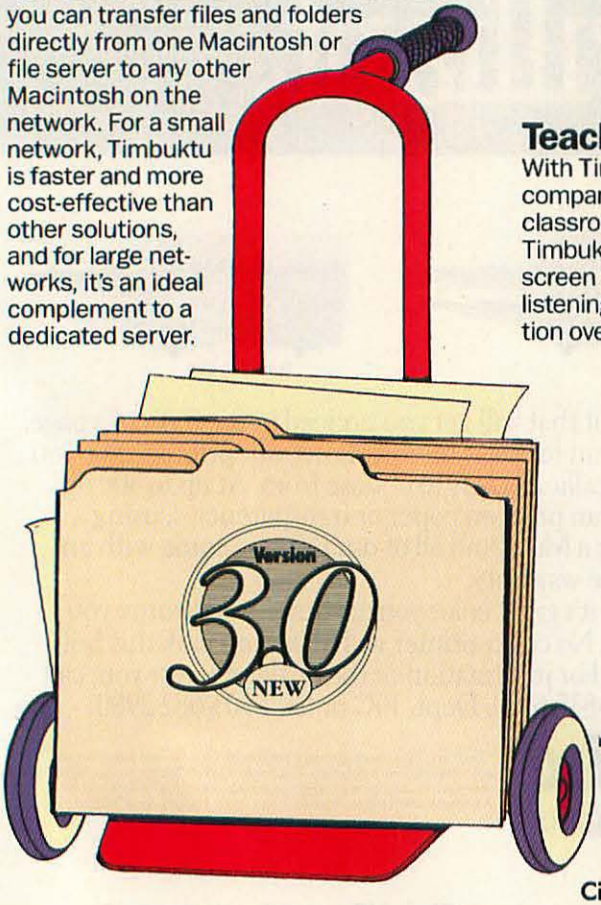
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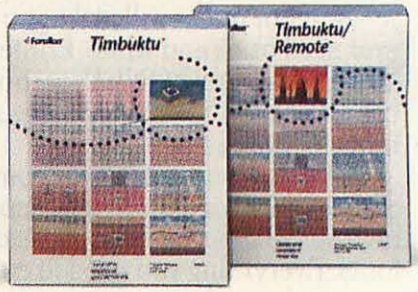


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An interview with Michael Spindler, the chief operating officer of Apple Computer

BY JERRY BORRELL

Michael Spindler was recently named chief operating officer (COO) of Apple Computer—at a time when strife between John Sculley and Jean-Louis Gassée had reached a peak and just before Gassée resigned. Spindler, John Sculley's second-in-command, is the most highly empowered individual ever at Apple in terms of revenues, staff, and breadth of responsibility—Apple USA, Apple Worldwide, Marketing, Manufacturing, Apple Pacific, and Apple Europe all report directly to him. Spindler is also the most qualified executive ever at Apple—his longevity in the computer industry is bettered only by vice presidents in Apple's product engineering group. John Sculley says of Spindler, "I wanted someone I could trust and whom I like to work with. The position had to be filled with someone 'homegrown' because Apple is too difficult a company culturally to just bring in someone at this high a level." Spindler's most challenging assignment while at Apple has been over the last two years: getting Apple Europe in shape for the nineties. Apple now plans to draw on Spindler's experience to direct the other parts of the company.

Spindler grew up in West Germany, where he studied electrical engineering, graduating from school in 1966. At the age of 24 he joined Siemens in Germany, working on the development of peripherals for a locally built mainframe. He then went to work for Schlumberger as a system support engineer. In 1970 Spindler was hired by Digital Equipment in Europe and spent eight years in positions ranging from sales to marketing to product-line management. In 1978 Spindler went to Intel to be its microprocessor marketing manager for Europe, a job in which he became friends with Regis McKenna, one of Apple's founding figures. Spindler started Apple's European office in 1980 when sales totaled $20 million. In 1989 his group, Apple Europe, was responsible for more than 24 percent of Apple Computer's income—almost $1.4 billion in revenues—with a $2 billion run rate projected for the end of 1990. A fluent speaker of English, German, and French, Spindler represents a type of executive one might not expect to find as second in command at a U.S. company.

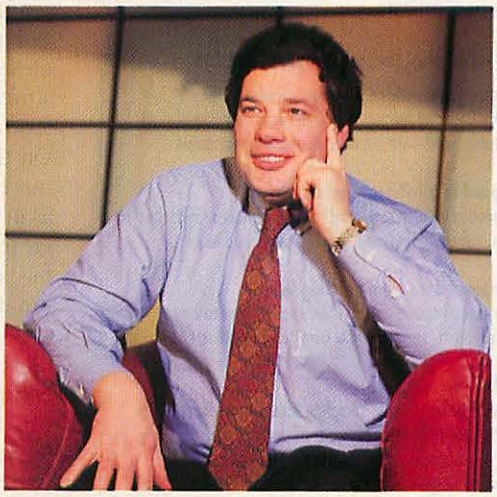
MW What are your responsibilities as chief operating officer of Apple?

SPINDLER My goal is to look at how to run the company from the perspective of integrating the three geographic regions (Apple USA, Apple Pacific, and Apple Europe), with a consistent view of how we develop products and services, how we market products, and how we integrate manufacturing into all this.

MW What is the first order of business for you as COO?

SPINDLER To improve upon what we think we can do in sales during the remainder of this fiscal year, given our present products. To fill the job of president of Apple USA and to start work with this person on a long-term strategy that takes into account that the United States is the largest geographical area that Apple has.

I am also busy with John [Sculley] and the engineering organization, working on the long-term technology platform and figuring out what business Apple wants for the nineties and put that into the geographical regions. We'll get those strategies from Randy Battat's (vice president for Product Marketing) product marketing division.



DRAKE SOREY

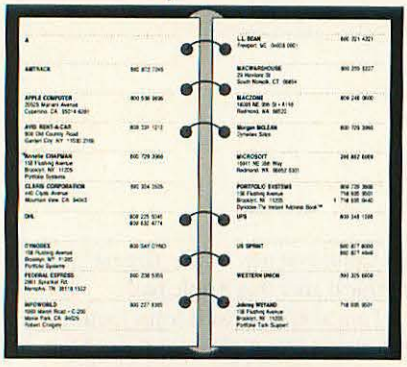
MW What will you do, leading Apple Computer?

SPINDLER Do I have to answer that one? Well, let me answer it this way. For a start, I would change your frame of ideas. It's not that we have territorial divisions, but divisions on how to do business. I am concerned about the functional structure of U.S. corporations and their ownership. Especially when they have to compete with Japan. For example, the cost of capital for U.S. companies is two times that

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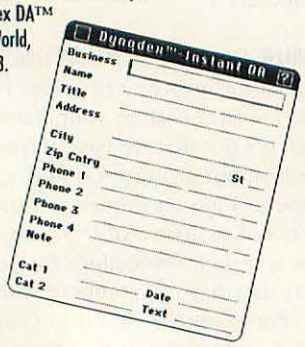
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of companies in Japan. The owners in the U.S. are institutions and they're not interested in products or in our customers. They want to know the rate of appreciation of a T-bill versus the rate of Apple's return. Greed represents a long-term strategy, but companies have different needs than investor greed. And U.S. companies today must pay too much attention to Wall Street.



MICHAEL SPINDLER IS THE MOST EMPOWERED EXECUTIVE IN APPLE HISTORY

There are two big elements in U.S. corporate strategies. First is the restructuring for the sake of restructuring. Companies become too heavy so they don't focus. There is a point to restructuring if it allows them to leverage their resources and if they have good products. But the companies that are restructuring are debt laden, and they're leveraging consumption in the future. On the other side is the taxation required to finance the infrastructure, as in the social model. We have got to go to the middle where government has some role in setting regulations but does not totally run industry.

The question about the structure of U.S. corporations is how can we compete? The Japanese have structured companies that are better suited for global competition. The holding partnerships are banks, and major shareholders are banks in Japan as they are in Germany. Daimler Benz is 25 percent owned by the Deutsche Bank. Over time the multinationals may fend off the Japanese, but the next five years are crucial in information technologies.

MW So can Apple become a global company?

SPINDLER Think of the model of a global company. Apple can build a corporation for the long term. Information technology is a growing business. First there is competition. Then there are the shifts of the technology in information technology that in the short term are not conducive to a stable business. If you constantly try to keep business stable, you won't succeed. This business has short cycles.

That's one reason why we have cash on hand, to have stability. We have our asset sheet extremely sound. Our return on equity is the highest in this industry. We stay fiscally conservative in order to invest if our core business grows. A similar example is Berlusconi, one of the four major Italian *condottieri.* They have everything from supermarkets to travel. The supermarkets are leveraged to travel, to hotels, to their privately owned TV networks running ads for the products they make to leverage their sale to supermarkets. Everything finances itself. But that's not possible in our kind of business—with software, you can't bundle all of the things that you need for computers.

MW You are the seventh person in the general position that heads up Apple's sales and marketing over the last four years, beginning with Bill Campbell and continuing through Allan Loren. How are you different?

SPINDLER First, I see the situation differently. I see Apple USA as a total business entity, not just in terms of sales and marketing. One thing I do is separate the identity of U.S. internal marketing from the identity of the corporation on a global basis. Apple USA runs the USA. That is something that's largely not done in United States companies where products originate from the United States and are marketed worldwide.

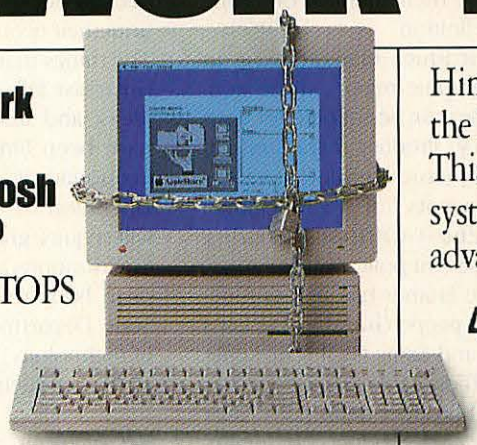
My definition of a corporation is not confined to a nationality. Apple's perspective is the same, whether it is implemented in the U.S. or in Japan. It's not a perspective of selling *from the USA.* I work with markets worldwide, developing application functions for regions that each organization manipulates to meet its needs.

MW Can you distinguish between Product Marketing under Randy Battat and Product Marketing under Mike Homer?

(continues)

Take This Simple Network Test.

See Us At MACWORLD Expo San Francisco April 10-13 Booth #917



1. Which Network Doesn't Tie Up A Valuable Macintosh As A File Server?

☐ AppleShare ☐ TOPS
☐ DaynaNET

Hint: AppleShare® requires a dedicated Macintosh® as a file server. DaynaNET™ runs on an inexpensive yet fast IBM® compatible 286 or 386 personal computer. Distributed networks such as TOPS® don't require a dedicated file server, but steal processing power from every Macintosh on the network.

2. Does A Real Network Need A Dedicated File Server Anyway?

☐ Yes ☐ No

Hint: A file server provides centralized storage and management of information and a basis for running multiuser applications. Dedicating the file server improves the network's performance, reliability, and security. Even small networks can benefit from a dedicated file server.



3. Which Network Operating System Is The Fastest?

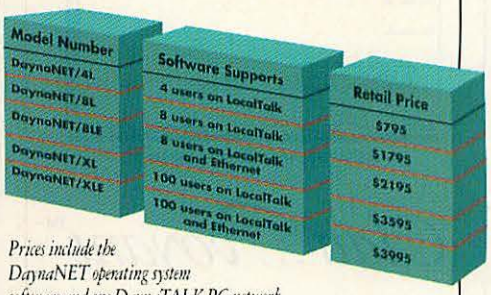
☐ AppleShare
☐ DaynaNET
☐ TOPS

Hint: Both TOPS and AppleShare run on top of the Macintosh or MS-DOS® operating system. This slows them down. The DaynaNET operating system directly controls the file server, taking full advantage of all its speed and processing power.

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Answers:

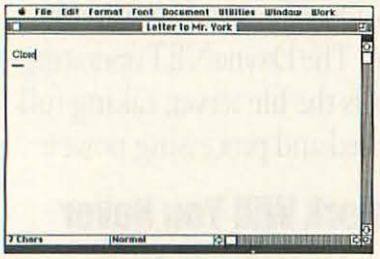
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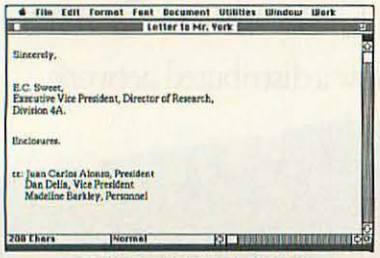
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SPINDLER We need a consistent marketing strategy for applications, so that if one group says this is what A/UX is, that's what it is. Developing a statement of strategy is the responsibility of Randy Battat. If we say this is the definition of CISC versus RISC, then there is only that one definition. If there is a definition of database server on the Mac, then there is only one possible definition.

With product management in every geographic region, these general strategies can be adapted for each constituency. Product managers can decide price issues and integrate important concepts into their regional environments—without deviating from a consistent policy.

So Mike Homer has similar functions to his peers, Guerrino De Luca in Europe and Satjiv Chahil in Apple Pacific. All these teams work together on regional product definitions, user research, pricing, product positioning, and the like.

That's what I want to achieve in international forecasting and for all of our critical activities, so that all geographic regions can sit down together and decide what to do, and when and where to do it.

MW What were your responsibilities as president of Apple Europe?

SPINDLER In the widest sense, building business for Apple: building the marketplace and distribution channel; looking at Apple's presence and making it into an internal business in Europe, with the look and feel of a European enterprise; and building the business as a platform for Apple's global strategy.

A lot of factors are important: how you manufacture, the scale, the integration of R&D into manufacturing. There can be no provincial view of our goals if Apple is to be a visible player in the European economic scene. We must add value to the European market.

That's a lot to ask, with only 14 years in the personal computer environment. Others have had more time to do the same thing, for example IBM. Time is compressed for us and our growth is fast. Our compound average growth rate is over 45 percent for the last 3 years. Also, our contribution to the company grew as fast, even faster.

MW How has the European market changed?

SPINDLER There's promise for the countries of Eastern Europe in the next decade, but nothing will really develop until their economies develop further. The things that have happened so fast since last fall—such as the liberty of ideas, and freedom of movement—have been limited to political areas. Economics is a longer-term strategy. Liberation to the fullest extent here will require greater support from U.S. organizations and COCOM [the European body that works with the U.S. State Department to regulate export of technology] so that we can market all the products we develop.

MW In terms of geography, what is Apple Europe?

SPINDLER All of Europe, Africa, and the Middle East, but you can't look at the geography from the standpoint of a map. We have to look at all of these regions realistically in terms of sales potential.

MW How do you rank the European markets in terms of revenues?

SPINDLER For Apple, the ranking is France, the United Kingdom, the Scandinavian countries, Germany, and Italy.

MW What about the Eastern bloc countries and the USSR?

SPINDLER They're also part of our territory, but the map hasn't had much to do with the fact that until recently those countries have been exempt because of export restrictions from the Department of Commerce and COCOM. The 68000 has recently been legalized for export to the USSR and the COMECON [the Eastern bloc equivalent of the European Economic Community] countries. In reality we have to make an estimate of what our return from sales in the USSR is likely to be. I was in Moscow recently talking

(continues)



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with them about these things.

MW Will you begin to export Macintoshes to the USSR?

SPINDLER It's not easy to do. The ruble is not easily convertible, and the Soviet Union has to give an exchange of goods to the West such as gas, minerals, or chemicals to create hard currency. The Soviets send materials in exchange for such needs as machine tools and processing plants.

We're now in a development controversy as well. MS-DOS technology went into the Soviet Union via foreign clone exporters. The 68000 is now legal; so are IBM PC– and AT-class machines. If the Soviets circumvented the regulations with DOS-based technologies via clones, they may have a lot of cheap hardware already installed.



THE 68000 HAS RECENTLY BEEN LEGALIZED FOR EXPORT TO THE USSR

The question in the USSR is the direction in which the computer industry will move. Will it move more in education and in training, or in building an entire knowledge base in MS-DOS? That's a big debate. To what level will firms transfer technology? There is no vendor industry, no third-party industry, no software vendor base, no applications software. The Soviet market is a long shot for us and it's important for us to recognize that there is no quick success there.

MW Does the USSR uphold international copyright conventions?

SPINDLER The Soviets are cognizant that they're doing the wrong thing. When they say they're running UNIX and you ask them, "Do you have a license for that?" they say, "Well, no." The same thing with DOS technology. In general there is a lot of work to be done to tell them how to localize products without infringing upon copyrights.

The same was and is true in developing countries such as Brazil, which doesn't support intellectual property or copyright of computer software. Brazil does protect the copyright of books, so software vendors charge more for their manuals than for their software.

MW Apple established a manufacturing site in Cork, Ireland, early in its history. Why?

SPINDLER At the time when we went there, in 1981, Digital Equipment and other manufacturers were already established there. The Irish had a young work force, they were hungry to learn and accomplish something, the Irish government had developed aggressive policies to help companies get set up, their language was compatible, and their financial strategy was very advantageous.

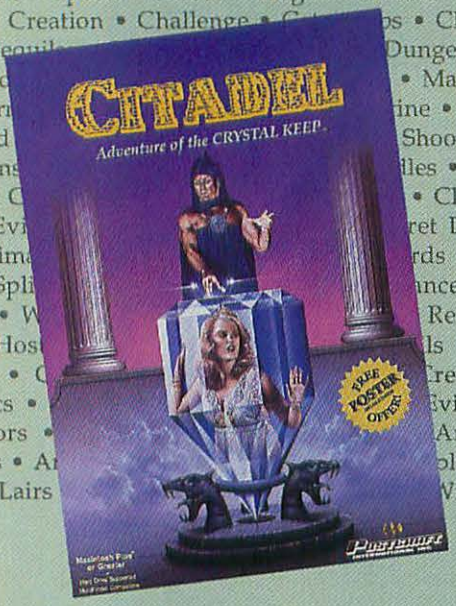
MW What does Apple do in Cork?

SPINDLER We started to support products for the Apple II. Today Cork produces all types of Macintoshes and handles all localization for system software as well as LaserWriter integration. It does its own sourcing in Europe, the U.S., and the Far East at the component and finished-good level—it gets plastic from Germany, printed circuit boards from the U.K. and Spain, and DRAM chips from Austria. The ImageWriter is sourced from the TEC group in Japan and manufactured under license in Germany, while monitors are sourced from Philips in Italy.

MW Was it necessary for Apple to establish a facility in Cork when it did?

SPINDLER No. But we believed that Europe was significant for Apple, which it is, and that in the long run our being in Cork might serve the European market better. There's one condition of Europe that you must understand: there is no *single* European market, never will be. Never one large single culture, no matter what happens after 1992. While Europe may become one wide market in 1992, countries will still be unique. Countries will still think about themselves first before others.

(continues)



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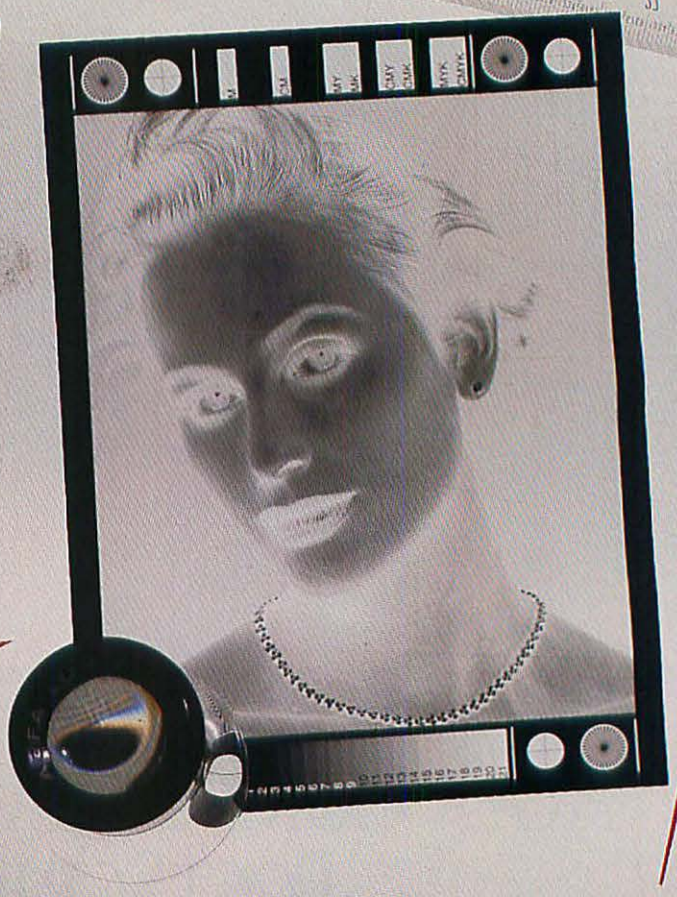
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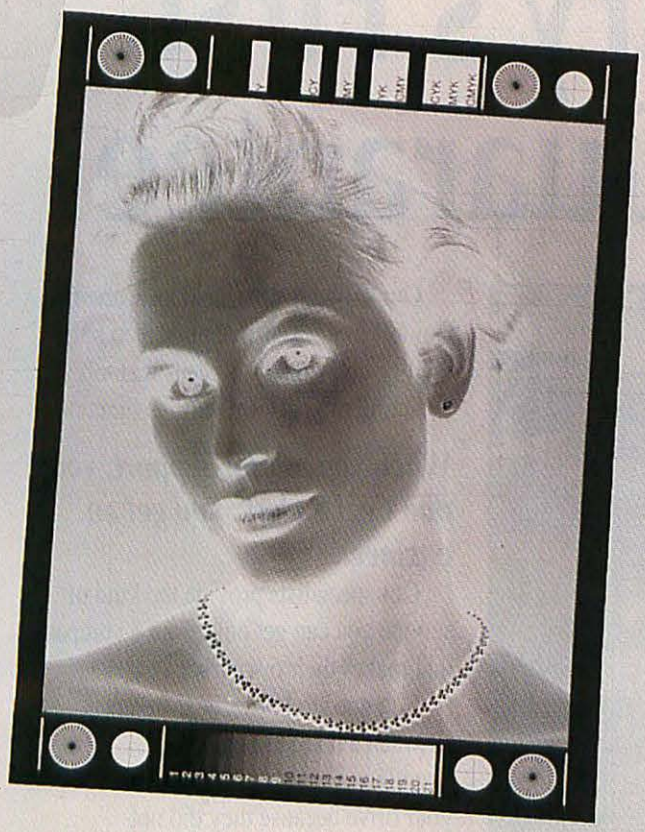
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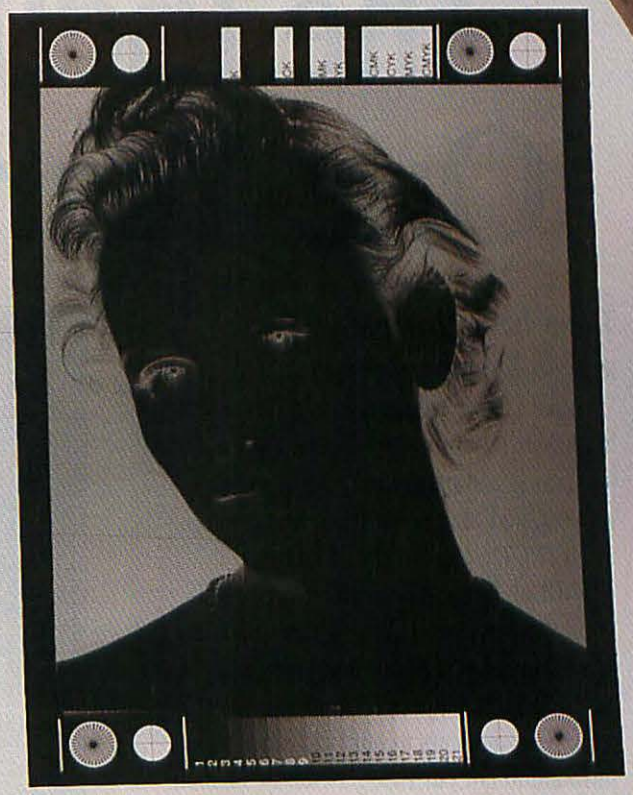
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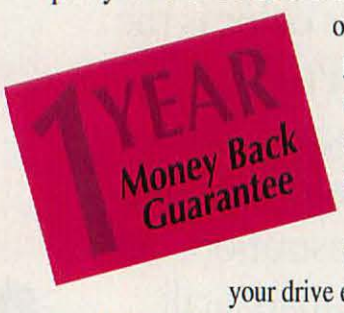
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Europe has the characteristics of a lab trying out things in localities. Thinking globally and acting like localities. So we're finding what is common and what is different in these markets.

MW What will happen to Apple Europe in 1992?

SPINDLER There will be some cost decreases, simpler distribution—for example, we'll use just one trucking company. And if we get a market with a single technical standard in some areas, that's a step in the right direction. For example, we had a scheme for one modem in two pieces (one for power, one for different plugs) for all of Europe, but the Germans insisted on welding the two pieces together, so we were stuck with a more expensive approach.



TO DATE WE'VE SEEN NOTABLY LITTLE SUCCESS FROM EUROPEAN DEVELOPERS IN THE U.S.

And there are other issues: labor and law, the social charter of employment, safety, and health. We have to deal with these issues, but they will not be regulated like telecommunications. People in businesses see a large market, not these issues.

MW How many localizations are done by Apple Europe?

SPINDLER About 18, ranging from Greek to Arabic. Due to the Mac architecture we can do these things faster than other computers, which is especially hard where there are non-Roman scripts.

MW What is localization?

SPINDLER In terms of our computers, it is the basic adaptation of system software and technology to meet the natural language environments of our markets. It provides the multilanguage menus, and supports programming aids. Localization is a joint effort between the local product marketing group and the Cork group that manufactures products for different national markets. This is true for CPUs, printers, and networking and communications products.

MW What will Apple have to do differently in the Europe of 1992?

SPINDLER Not much. There is nothing to stop us from building the business. There are about a dozen things that we watch. One issue is whether one nation's laws can be applied in another nation. For example, if one country has a higher safety standard than another, can a product that meets a European standard be shut out of the former's market? And what about VAT, value-added taxes, which might be 33 percent in one country and 14 percent in another? Governments raise much of their income with VAT. How will these be applied?

MW What is Apple's largest competitor in Europe?

SPINDLER I categorize them as "the others" and I welcome them if they push applications development and add to the technology.

Apple believes that the competitive pressures in Europe have changed because people now understand the differences between DOS machines and Macs much better than they used to. The Mac is five years old in Europe, and in the United States the company has in excess of $1 billion in revenues.

MW Is Olivetti a larger company than Apple in Europe?

SPINDLER This whole question of who is larger may be of interest to some, but it's a hard question to answer straight. Sure, if you include all of Olivetti's corporate operations, it's larger than Apple in Europe. But it's hard to get the data on the personal computer side. They have a direct-sales force and for that portion of their sales we don't know figures. Research analysts try to track who sells how much of what, *(continues)*

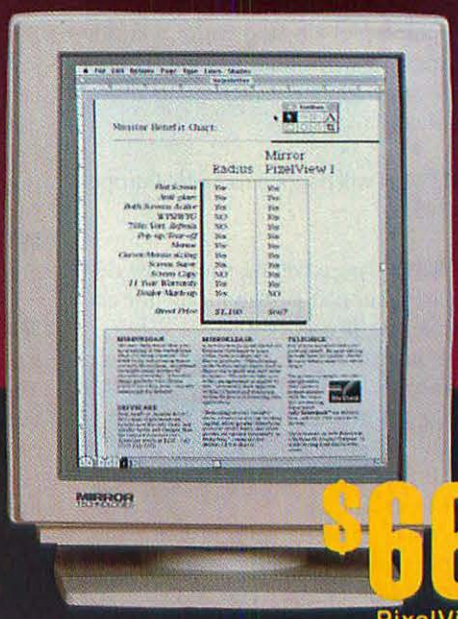


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Menu bar sizing	yes	yes
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MP100	100	797	887
MP200	200	1147	1227
MP290	290	—	1997
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and which store sells what, and what distribution channel is doing how much, but doing that on a global level is a mess. I don't know, it might even undervalue Olivetti.

MW Does Apple have any real European competition in Europe for microcomputers?

SPINDLER It's hard to guess. All of the other companies try to be full-line vendors, from personal computers to mainframes, so they have a huge base and a huge amount of problems to solve. There's Bull in France, Siemens in Germany, ICL in the U.K. It's hard to rate their business outside of their own captive markets.

MW What about Eastern European markets?

SPINDLER Hungary represents a different opportunity than the Soviet Union because Hungary has moved toward the market-economy model for some years. It has a large software industry, some more flexibility, and the currency problem is easier. Hungary has tried new things and is an easier market due to this openness.

As for Poland, Czechoslovakia, and Bulgaria, no. So far the needs of Poland are basic, like food and clothing. And the Czechs and East Germans are [in a different situation].

MW Will the shift to the Royal font format slow the development of markets with non-Roman font requirements?

SPINDLER We will support PostScript, but there is no reason to slow development with our current strategy. I would rather say that we are adding to our font strategy. From Royal will come new fonts and we will keep shipping PostScript printers. The inherent issues are the cost and speed of printing, and in a sense a new format is a problem, but over time our new strategy will give more flexibility to fonts and better speed to printing.

MW Tell me about Apple's research center in Paris.

SPINDLER I prefer to say that its purpose is not research but to develop products. The mandate is to look at Europe and globalize product categories. Making Apple modems work acceptably worldwide, for example. And, in any case, we can test European products in ways that we can't test them in the U.S. because of the difference between networks. In a sense that would also be useful for video [because of European standards], but at this time all development for video technology resides in Cupertino.

The second mandate of the group is software development. So there is a full-fledged effort in a concentrated way to do specification work in OSI and in ISDN because those areas of growth are faster here than in the States. In France, telecommunications leads in innovative technologies. Currently France has public networks with higher speeds, and it is important for us to see and understand these. It is good to combine our research with the work of the PTT [Post Telephone and Telegraph] labs. The PTT has network research, such as in imaging, that we don't have. So our focus is on products that have an advantage in Europe.

On another side, Apple Europe doesn't develop, doesn't test, like in the U.S. It finds specific products in areas of interest where Apple can marry technology and university research. Unlike in the U.S., professors in Europe don't leave universities to start companies. When Apple Europe sees promising technology, it tries to get developers to make products in that area. There are a couple of areas like that, such as multiprocessors at the University of Lund in Sweden where Apple encourages local producers of a technology to work with the academics.

MW How does the decision-making process work for Apple Europe? Do decisions emanate from the U.S., or are they joint, negotiated decisions?

SPINDLER Rather than take the multinational approach of the sixties and seventies, where divisions are either independent from or slaves to a central company, we have a more mature model.

Apple has had to become an international company faster than most others, and we have built three international units [USA, Europe, and Pacific] that have to perform manufacturing; research and development; sales, marketing, and distribution; and so on. And we look at the company as three international units rather than take a provincial view. The 1992 debate has big issues and you can't consider that debate if at the same time you don't know who your real enemy is—that is, decision makers within the company, or in companies outside in a larger international environment.

MW What are the largest application software developers in Europe?

SPINDLER I really see a repeat of the applications areas elsewhere—I see U.S. vendors' products. Spreadsheets and word processors are still the most demonstrable software in the installed base and for sales. It's probably the same in publishing, with Aldus PageMaker and the like. Then there are the more subject-oriented market segments like illustration software with Adobe Illustrator, but that's less visible because you assume these products are part of desktop publishing.

Also doing well in Europe are more vertical business products—database-management systems and productivity tools to support business needs on a personal computer. Another area is technical applications, such as architectural drafting programs. And other enabling applications that sell "backwards" in the U.S. such as 4th Dimension [developed in France], or archiving software that was developed in Belgium. We help in trying to match software products with areas that we support in the market. There are about 4000 certified Mac developers in Europe, perhaps 15,000 developers worldwide. About 1000 of those developers are in France.

MW But to date, we have seen notably little success in America from European developers, even those from France, which is the healthiest European developer market.

SPINDLER That's probably right. My opinion of what sells in the U.S. is directed by what is out in the major markets, like word processors, which

(continues)

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is a large industry. Microsoft has built the distinction of Word even for Europe. The development for Europe is probably more in the project sense, to provide business solutions, not merely to provide products and information, but to provide businesses with support. The U.S. market is more interested in products. In Europe some resellers are also developers for business applications, while in the States the business-channel base and the software-reseller base split on ways to get solutions to the user. In Europe, in channel selling we try to sell support and solutions to businesses. Businesses depend upon resellers who install products, offer support, write software—who provide more than just boxes. We've worked for years to build the companies to do these things.

MW How many employees does Apple have in Europe?

SPINDLER Apple has 1300, not including manufacturing.

MW You're an outspoken advocate of spreading information technology to the third world. Can the Mac actually be sold into these countries?

SPINDLER In the long run, yes, but it has to be done in a responsible fashion. Nations can't just "get" technology and independently begin cloning it, rip off the technology and then begin exporting again.

I've dealt with this situation in Brazil and Mexico. First they want to build technology in their countries, then they want to export it back to the originating countries. Fiat in the USSR is another example. Fiat licensed technology to the USSR to build Fiats, or Ladas as the Polish called their Fiats. Then Ladas began to be sold into the Italians' own markets at a cheaper price. The transfer of technology could work, but we don't want to build a market that is going to come back into the European market.

MW What happened with Apple's plant in Mexico?

SPINDLER In 1981 the Mexican government had a shift in policy to not allow foreign ownership of manufacturing and business for personal computers and other areas. The Mexican government said that any company must be a joint venture and have 51 percent Mexican ownership. There was a company set up called Apple do Mexico owned by Mexicans that imported Apple IIe motherboards from Dallas for assembly in Mexico. I felt it was a little misleading, this company introducing its own keyboard and power supply with our Apple II motherboard. But Apple II sales boomed and the sales base increased. Then we began to see MS-DOS clone boards and kits coming in from Taiwan assembled by Mexican operators that competed with the Apple II from abroad.

As a result, sales of the Apple II went down drastically. The only way to increase the competitive picture was

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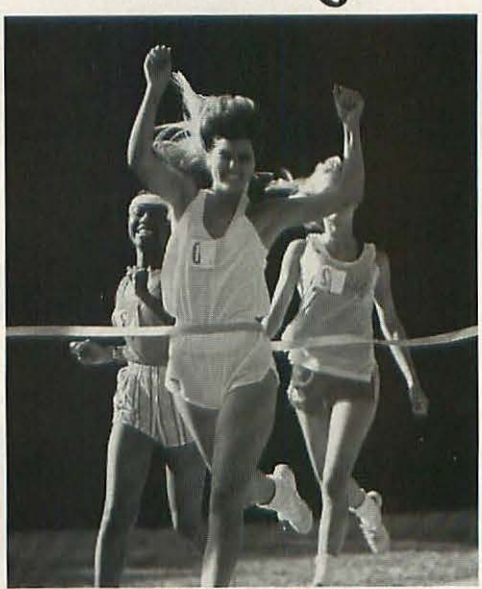
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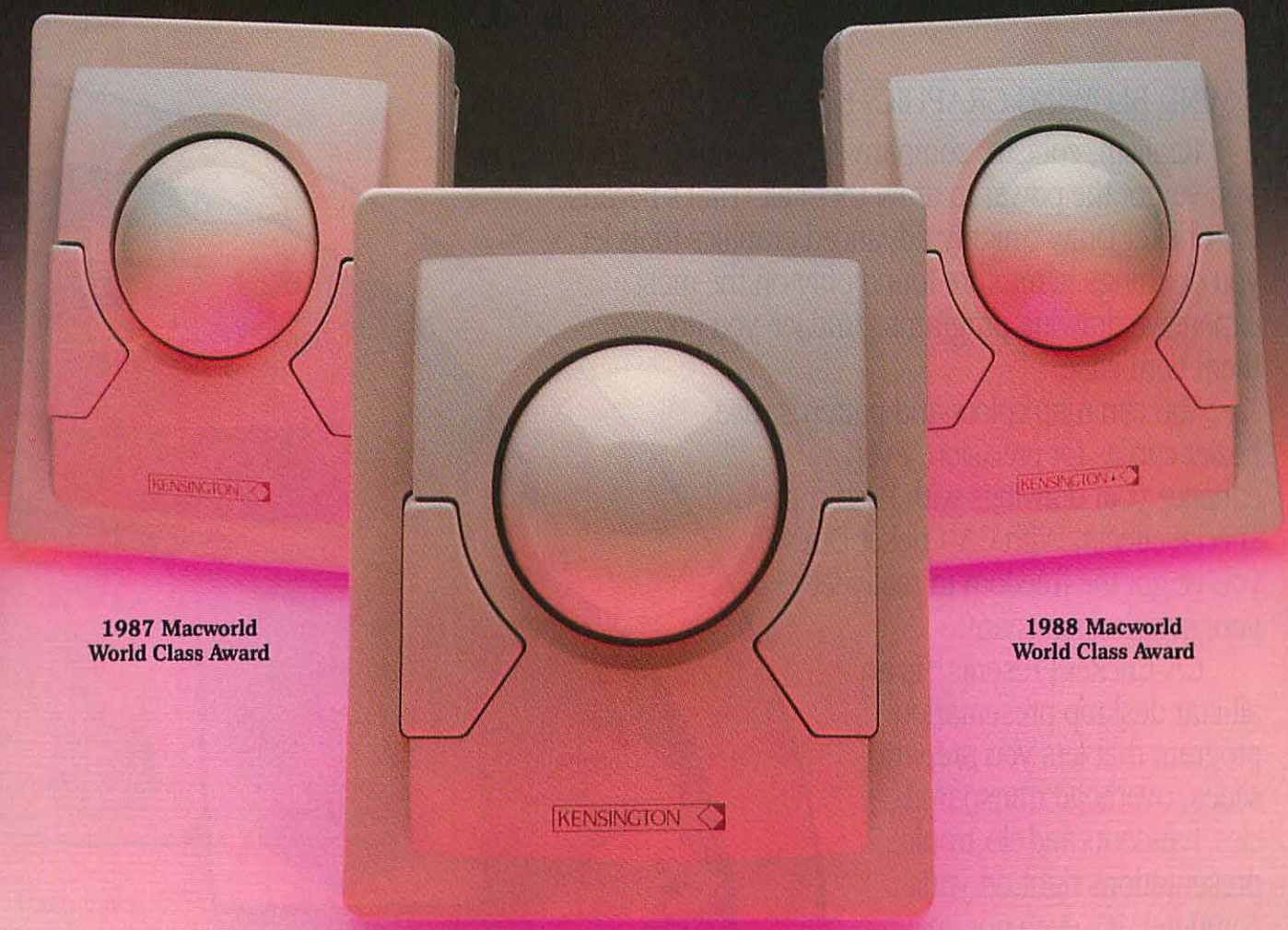


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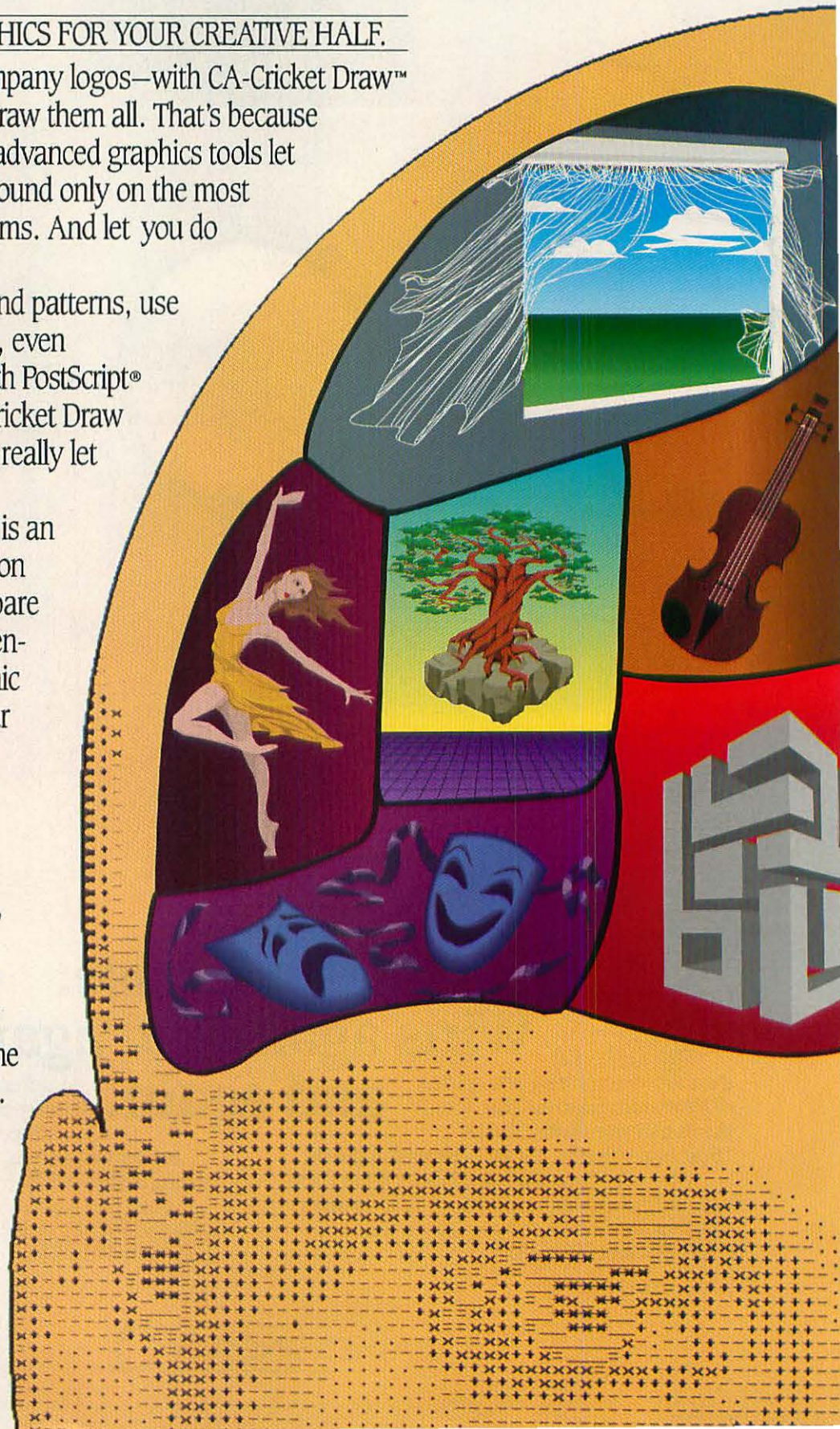
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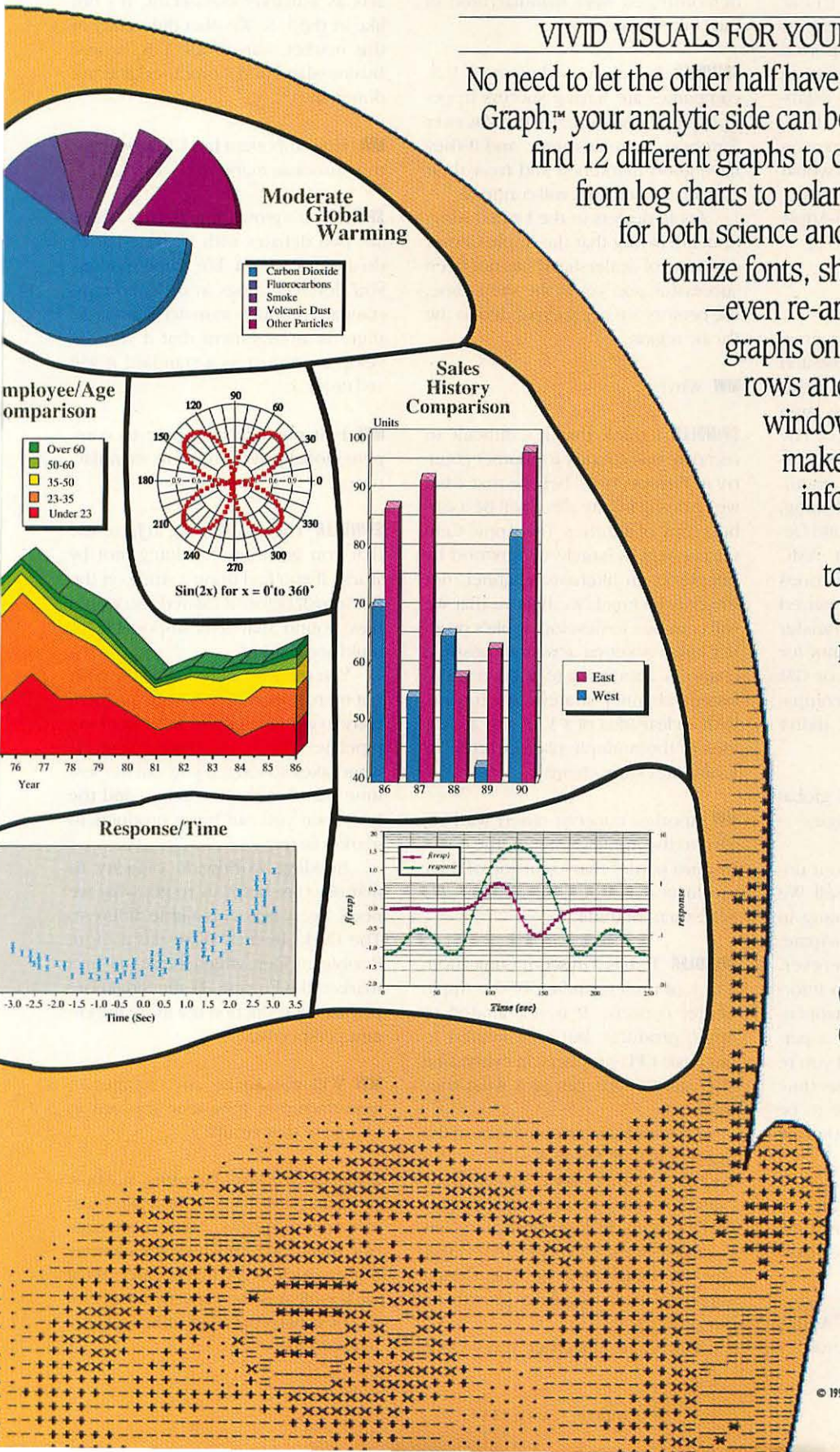
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to bring in Macintoshes, but we were asked to build Macs in Mexico. In other words, we had to transfer manufacturing to Mexico. The final blow to our work there was the Mexican export rulings. For every dollar you imported you had to export three. It was an attempt by the government to establish manufacturing and export business in the country. And the reason why we didn't do that was that it would have been very hard to give our manufacturing technology to a non-Apple company.

MW What happened?

SPINDLER We shrank down our presence to maintain the installed base and business to give support to the existing users. We still had a very large base of Apple II users in Mexico. The rules have changed 180 degrees recently and now favor foreign manufacturers. China tried the same thing, asking foreign companies to build factories before having a market. AMC and GM were asked to build factories in China in 1985. Then they realized they were being asked to transfer technology—not to build plants for internal consumption of AMC or GM vehicles, but to allow the host companies to export vehicles. So it didn't come to anything.

MW What about the issues of global access to information technologies?

SPINDLER There is the issue of our understanding how and what we sell. We need to know what is happening in the markets in which we participate: Japan, Korea, Malaysia, wherever. Thirty years ago there was no information available on what was happening in various markets. Today a person in the Far East knows what you're doing in Europe at the same time that you're doing it. You have to be prepared to move in many markets at one time.

MW What is the worst product in the Macintosh market you can think of, or in the personal computer market as a whole?

SPINDLER In the Mac area, the AppleFax Modem. The PCjr was a lemon.

MW At the Paris Expo, the largest International Apple Expo, many people commented that most of the products demonstrated were manufactured in the United States.

SPINDLER It's obvious that small U.S. companies are having success in peripherals and software for the Mac over European manufacturers. And if they have good marketing and treat their customers well, that will continue.

Apple dealers in the United Kingdom are saying that the Apple Center concept [of dealerships] has not been successful, and yet at the same time, the centers are being expanded to the Pacific region.

MW Why?

SPINDLER I think that it's difficult to compare one country to another country in Europe, or to believe that what we're doing in one place will be a carbon copy of another. The Apple Center concept is largely understood by people as an alternate channel, not the only channel. We believe that we will continue to develop Apple's product line marketing across all possible channels. I am trying to build in a consistent channel strategy in Europe, with a clear idea of a VAR and a clear idea of the multiple-platform reseller [computer store chains].

MW Another concern raised with regard to the Apple Centers is the belief by third parties that exclusion of their products could be construed as acts in restraint of trade.

SPINDLER That is a miscommunication, a lack of understanding of the Apple Center concept. It is not limited to Apple products, but it is limited to our basic CPU products. In everything else, the Centers can pick what they want.

Another misconception about the Centers is that Apple is alone in this approach. Others have similar dedicated computer retail outlets, such as IBM's system-dealers concept in New York City. We use every channel available to make markets. The Center approach leads to greater growth for our products.

The large customer buys OS/2, DOS machines, Macs, and so forth, and the only single source for all of these is a multiplatform reseller that acts as a market consultant. It's not like in the U.S. We plan differently in this market than in the U.S., where Businessland and ComputerLand are dominant.

MW How important has UNIX been for the European market?

SPINDLER It's grown little by little. There are two debates with UNIX: what to do and for whom. For some markets you develop things in order to have standard products to match standards; there is an argument that if you develop a product as a standard it will sell faster.

MW Is it possible for Apple to compete globally in terms of its manufacturing?

SPINDLER There is a saying in Japanese that you get there by doing, not by study. If you had done a study on the Macintosh before it existed you would have found that it is impossible to build and market.

You can work at reducing the cost, but more important is having the mentality to get products in and out of the pipeline. The initial testing stage is what takes so long; if you can get less time between the marketing and the test, then you can bring products to market faster.

Building worldwide capacity to manufacture helps us to get what we need. Every factory is a little different. The Cork, Ireland, plant has a more flexible model, which helps us in a market like Europe. At the Singapore plant, cost reduction is a more important perspective.

MW Will you make any changes in manufacturing now that you are in charge of that group?

SPINDLER No. Manufacturing at Apple is world-class. Look at how we build in terms of quality, how we manage our inventory, and how we channel our products to the marketplace. What we'll look at is the capacity model for the next two years and utilizing facto-

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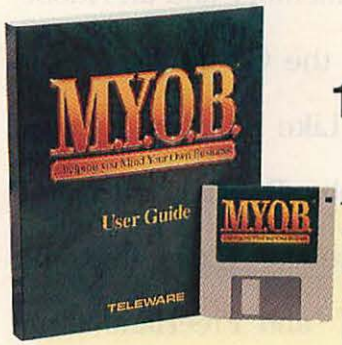
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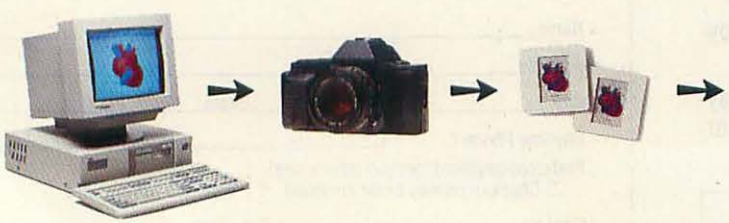
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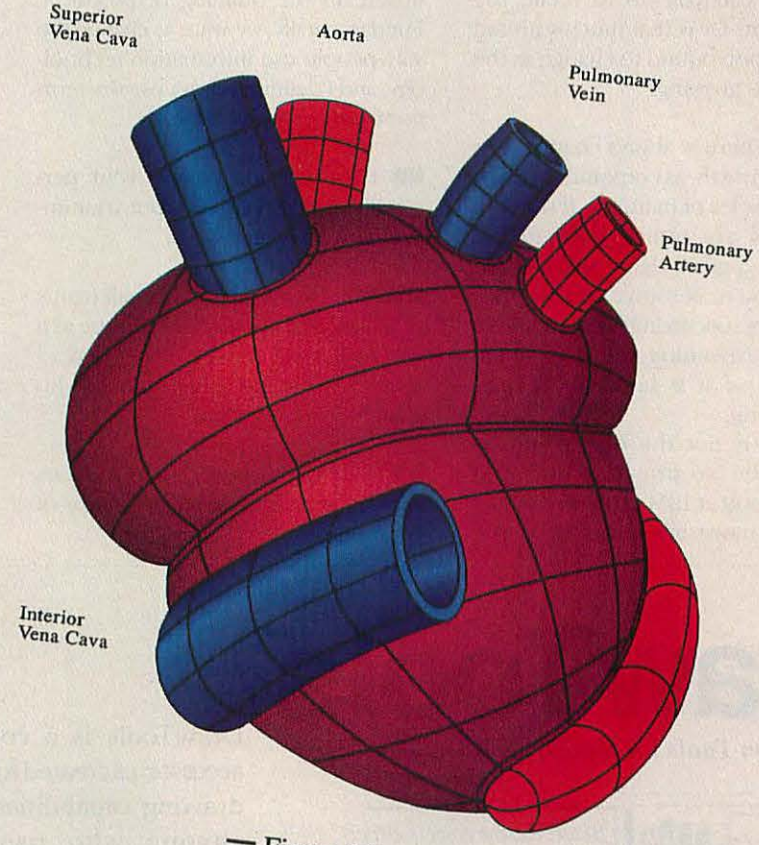
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Figure 36 —



— Figure 36 —

For lots of reasons.

Like a 16-character status display that provides menu-driven messages. No DIP switches. An autosense mechanism that adjusts the printer to the ribbon. And a compact design that makes it easy to fit in your office.

Specifications:
Resolution: 300 x 300 dpi
Output Media: Cut-sheet, paper or transparency
Memory: 8 MB RAM
Page Description Language: Adobe PostScript
Dim.: 17"W x 18"D x 9 1/2"H
Print Method: Thermal transfer
Features: Pantone certification, 35 resident Adobe fonts

Naturally, should you decide to buy a Colormate PS printer, you'll find that it's built with the same superior quality that goes into all NEC products.

After all, some things never change.

NEC

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ries and getting maximum utility to serve Apple's world markets. We'll look at getting the most efficiency in manufacturing techniques, in automation, in robotics, in materials handling, and how we can make progress in the last quarter.

MW What can you do to retain the Apple spirit? Or is that much-vaunted phenomenon bound to change as the company is growing?

SPINDLER There is always change during rapid growth, as corporations grow through cycles of maturity. If the fundamentals are intact, your raison d'être, it's a good sign—and it's also good if you're sensitive to the types of changes occurring as you move forward, explaining them in detail to people so it is understood what is happening.

Apple is not the only company that's been so affected by rapid growth. Look at IBM or DEC. We just generate more attention from the media—out of proportion to the events, especially given the changes and repositioning taking place at these other companies.

MW What are Apple's fundamentals?

SPINDLER We believe we're here to innovate in the building of products. Fundamentally, we want to change the way people use information technology, and I definitely don't use the term *personal computer* here.

MW How will you convey your personality to the company, put your imprimatur on Apple?

SPINDLER By starting with small teams of people. If I can point to Europe as a success, I will do the same here. I started with small teams, people who want to work together.

MW Will there be reorganizations within the next three to six months of your tenure?

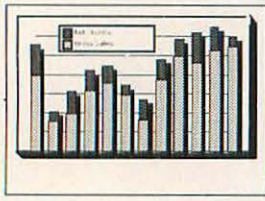
SPINDLER There is nothing broken that has to be fixed. There has been no large turnaround in our profitability, which is still growing at a healthy rate. Apple has a large cash reserve. We also have every interest in expanding our product line.

This is tough, given that we have chosen to go about our business in the way that we do. We have to define distribution in peripheral areas, define our system software, our architectural directions, and do the same in related areas like multimedia, developer tools, resellers.

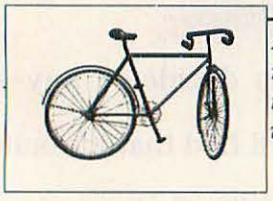
But it's intentional that we set the standards for our individual products for the future as we have in the past. We have to constantly look at our organizational designations, which means streamlining and matching our strategies to the changing environment of the marketplace. We also have to focus on developing the skill sets and management skills of our people—the main asset of the company. M

DrawTools™

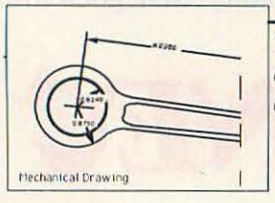
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Tools: Construct fillets, extend or clip lines and arcs, and snap lines.

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Jennifer – Customer Service Department



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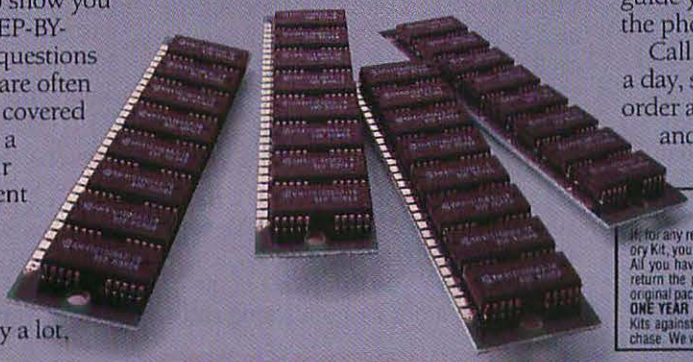
With the price of SIMMs at an all time low, thousands of Mac users are upgrading their Macs. In fact, our SIMMs chips have been in the top ten selling Mac products for weeks. But that's no surprise when you consider how many of the latest hot programs require extra memory.

And installing more memory is easy. It doesn't require technicians in lab coats. Every Memory Expansion kit comes with complete installation instructions.

But to make things even easier, we've made a short video to show you exactly how it's done — STEP-BY-STEP — and deal with the questions our technical support guys are often asked. Every type of Mac is covered and we think we've made it a breeze. As Jennifer, from our Customer Service Department says, "If I can upgrade my Mac, anybody can!"

As you'll see from the chart, Memory Chips are installed in pairs. Prices vary a lot, based on quality, speed and demand. At press time our price for 1MB 120ns Fujitsu chips is $99. Please call for the very latest prices and availability. You will probably need a simple tool kit ($15) and if you would like a copy of the video it costs just $9 for VHS or Beta.

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion.
2½ MB	Remove only two 256K SIMMs, install two 1M SIMMs.
4 MB	Replace all four 256K SIMMs with four 1M SIMMs.
To upgrade an 8-socket Mac II, IIx, IIcx, or SE30 to this amount of memory	**Do this: (install in multiples of four only)**
4 MB	Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.
8 MB	Remove all four 256K SIMMs install eight 1M SIMMs.



And just because we made the video, don't think our tech support guys aren't standing by. We're here to help with your choice of Memory Upgrade and to answer any questions you may have. If necessary they can guide you through the installation on the phone.

Call us anytime, twenty-four hours a day, seven days a week. Place your order anytime up to twelve midnight and we'll ship your order overnight for just three bucks!

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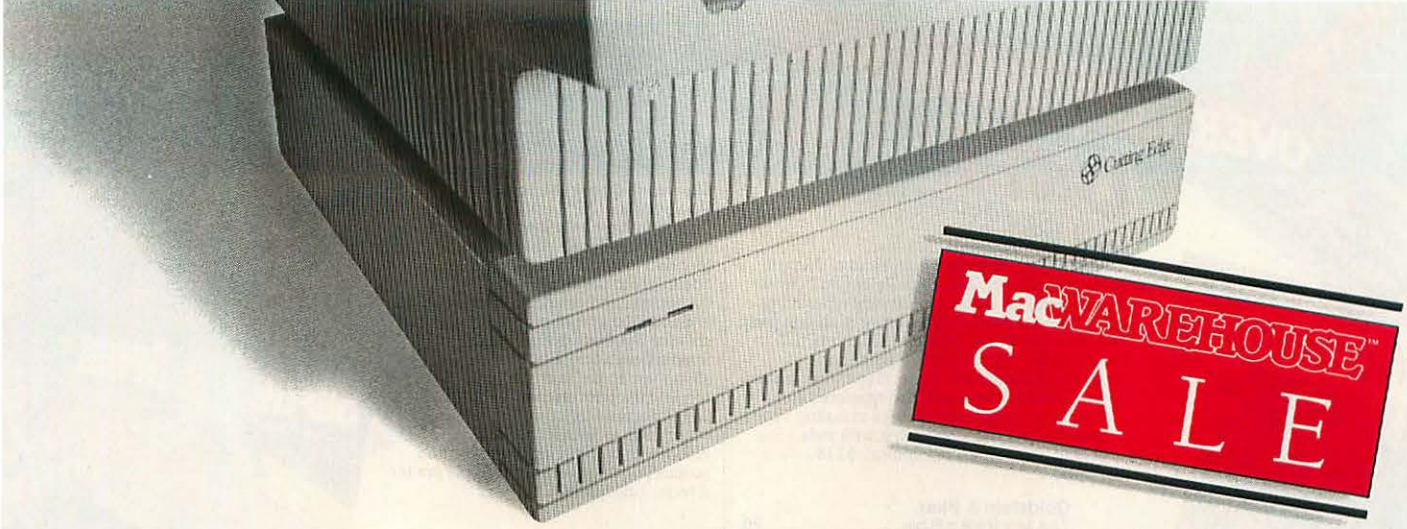
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CMS, MacStack	459	$70	499	$46	599	$26	649	$50	769	$30	839	$36
Dolphin, Integra	429	$70	479	$116	549	$170	615	$163	695	$300	829	$310
PLI, Infinity Turbo	—	—	569	$20	619	**$26	—	—	—	—	1098	$21
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Savings are calculated from MacWarehouse December 1989 published prices. *Quantum drives are for internal installation and require a 3.5 Internal Drive Kit for $59. **PLI is a 50meg turbo drive. ***40+ meg Removable Cartridge Drives come with 1 cartridge. Additional cartridges available.

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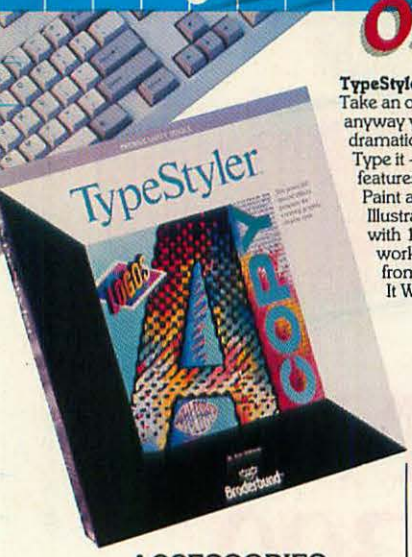
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MWEØD

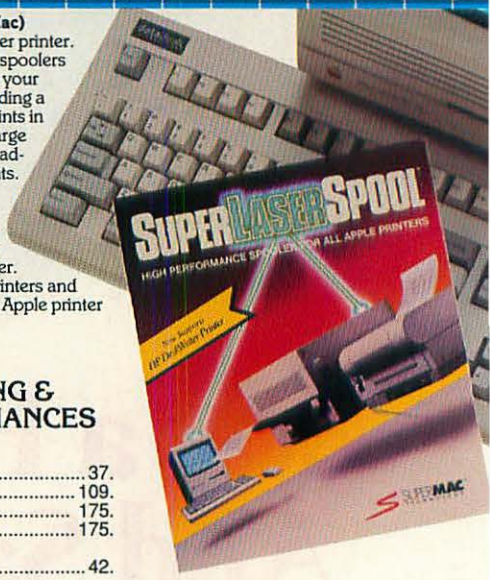
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HardTop Keyboard Covers 15.
HardTop ImageWriter Covers 17.
Keyboard Flip 6.
Dust Covers - Grey Nylon Ripstop
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Mac SE & extd. or reg. keyboard 11.
Mac II and extd. keyboard 12.
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Utility Pac 11.
Computer Friends, Inc.
MacInker (IW & IW II) 41.
Curtis
Computer Tool Kit (52 pc.) 49.
Curtis Clip 6.
Disk Holder (holds 40) 9.
Ergotron
MacTilt-SE 68.
MacTilt II-RGB 75.
Goldstein & Blair
The Macintosh Bible 20.
ICD
Graflex 84.
I/O Designs
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Monitorware Apple RGB Case 79.
The Ultimate SE Carrying Case 79.
Kensington
Anti-Glare Filter 33.
Apple Security Kit 34.
Mac II Stand w/Cable Kit 64.
MasterPiece Mac II 105.
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PowerBacker 1200 UPS Line 949.
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Softview
MacInTax Federal '89 - 1040 65.
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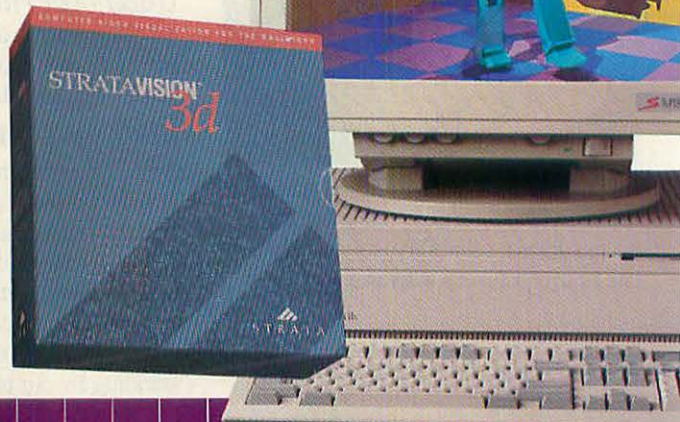
B.A.S.F. made in U.S.A
DS/DD (box of 10) 14.
DS/High Density (1.44 Meg) 24.
Sony
DS/DD (box of 10) 13.
DS/HD (1.44 mb) 24.



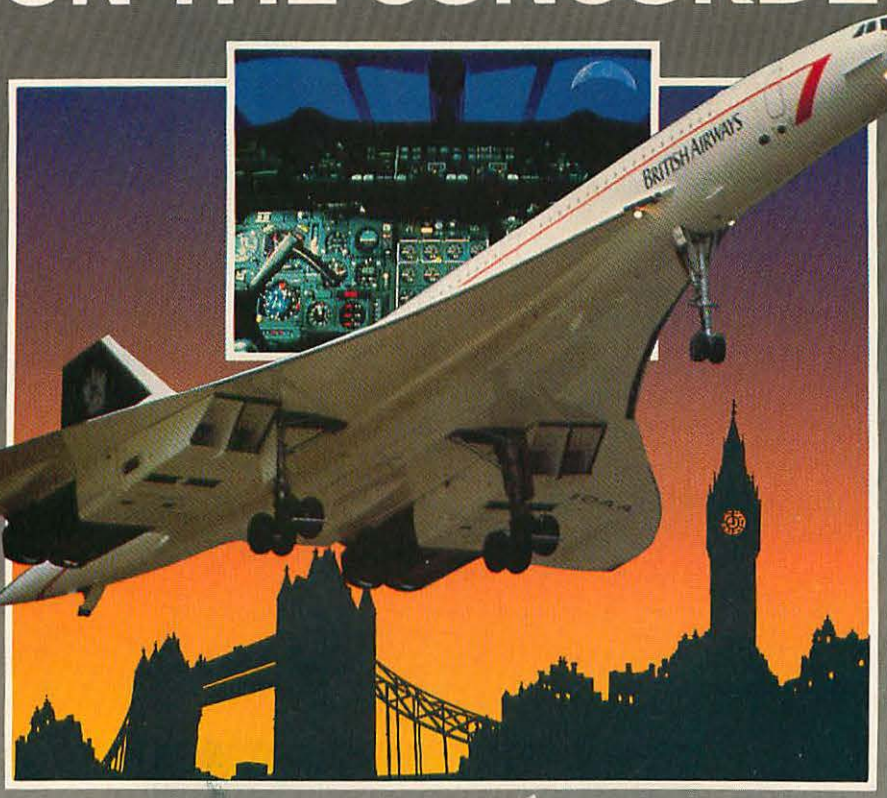
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Fanny Mac QT 55.
SE Silencer 39.
Polaroid
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Targus, Ltd.
Deluxe Plus/SE-XKB Case (black) ... 69.
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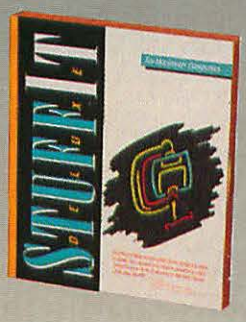
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Fox Software
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Casady & Greene
QuickDEX 31.
JAM Software
Smart Alarms & Appt. Diary 49.
Smart Alarms (1 - 4 users) 99.
Smart Alarms (5 - 8 users) 149.
Smart Alarms (9 - 15 users) 199.
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MacStack 44 Meg Removable 839.
Cutting Edge
800K External Floppy Drive 149.
SyQuest Removable 45 Meg 799.
Under the Mac 20 Meg 359.
Under the Mac 30+ Meg 439.
Under the Mac 45+ Meg 489.
Under the Mac 60+ Meg 589.
Under the Mac 80+ Meg 649.

Fujitsu
800K Disk Drive 159.
Kennect Technology
Drive 2.4 329.
Rapport 199.
Peripheral Land, Inc.
Infinity Dual Turbo 1875.
Infinity Turbo 40 Meg 1098.
Turbo Floppy 1.4 359.
Quantum
Quantum 40 MB Raw Drive 465.
Quantum 80 MB Raw Drive 735.
RasterOps
RasterOps Colorboard 264 760.

Vocabulearn (Penton Overseas, Inc.)
What are satisfied customers saying about Vocabulearn? Magnifique!... Wunderbar!... Maravilloso!... Why? Because Vocabulearn is the ideal language learning tool for students, travelers, business people and educators alike. Accomplished by storing the building blocks of language in versatile, interactive hypercard stacks, Vocabulearn makes learning foreign languages simple and exciting. Each kit comes with two 90 minute audio cassettes, a list of over 1500 useful words & expressions and Hypercard V. 1.2. Available in five languages and two skill levels...Bravissimo Vocabulearn! (education) French, Spanish, German, Italian **$29.each** Japanese **$35.**



Emerald City Software
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Icom Simulations
MacKern 119.
Letraset
ColorStudio or FontStudio Call.
ImageStudio 275.
Ready,Set,Go! 275.
Olduvai
Read-It! 2.1 (OCR) 245.
Read-It! Personal 2.0 125.
Read-It! TS (ThunderScan) 79.
Quark
QuarkStyle 169.
Xpress 449.
Spinnaker/Springboard
PLUS 115.
Springboard Publisher II 109.
TimeWorks
Publish-It! 225.

DISK DRIVES/BOARDS

CMS
MacStack 20 Meg 459.
MacStack 30 Meg 499.

Dayna Communications
Dayna File Single 360K (5 1/4") 498.
Dayna File Dual 360K & 1.44M 749.
Dolphin Systems Tech
Integra 20 Meg 429.
Integra 30 Meg 479.
Integra 40 Meg 549.
Integra 60 Meg 615.
Integra 80 Meg 695.
Flipper 44 Meg 879.

EDUCATIONAL/ PERSONAL

Beacon Technology
GEMS of the Word 25.
BrightStar
Alphabet Blocks 30.
Talking Tiles 27.
Bootware Software
ResumeWriter Pro 58.
Davidson
Math Blaster Mystery 26.
Speed Reader II 26.
First Byte
The Dinosaur Discovery Kit 27.
The Puzzle Storybook 27.
The Rhyming Notebook 27.
Help Software, Inc.
Desktop Help for Excel 50.

The "ULTIMATE" SE Carrying Case (I/O Design, Inc.)
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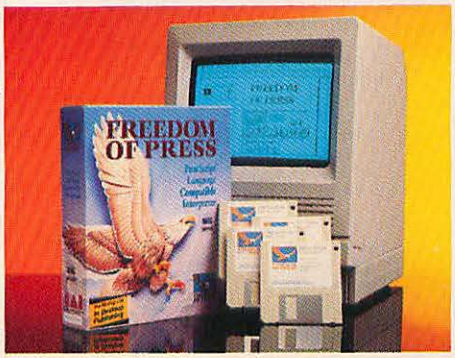
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TOPS DOS Network Bundle 165.
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Lap-Link III Network Pac 189.

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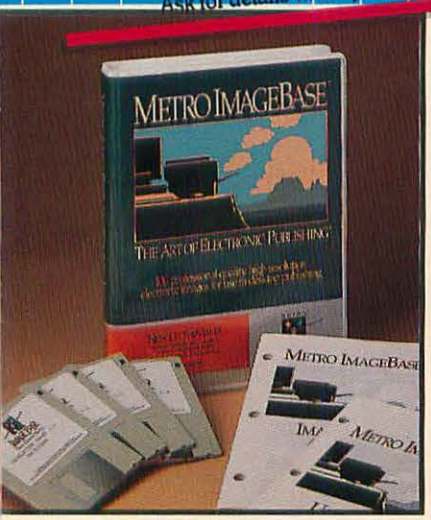


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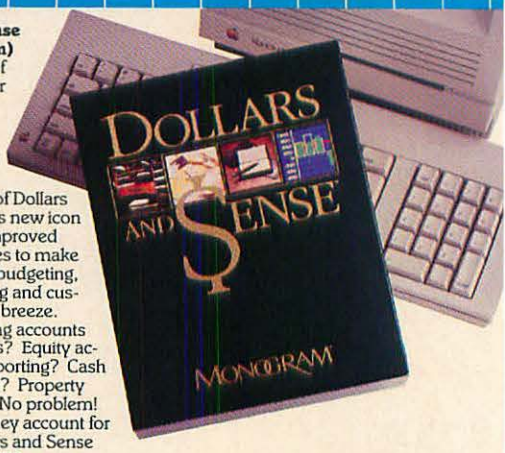
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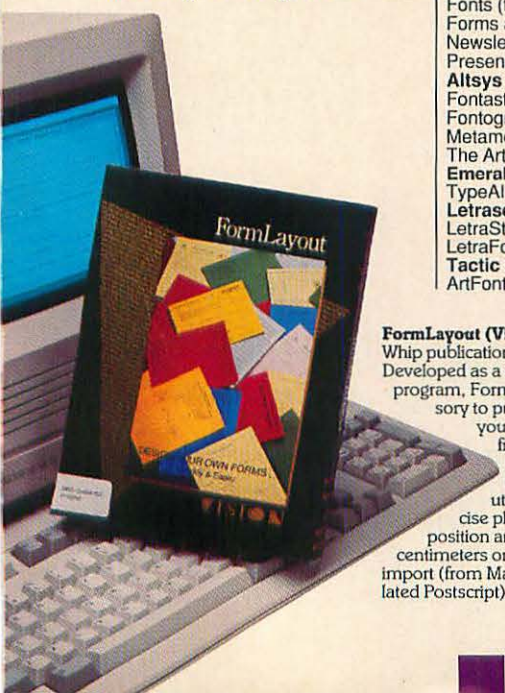
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Metamorphosis 149.
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Emerald City Software
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HYPERWARE

Bantam
Complete HyperCard Handbook 22.

NEW! The DataDesk Switchboard (DataDesk International) The new Switchboard is the first user-configurable keyboard. The unique, modular design allows the user to arrange the Alpha, Cursor, and Numeric keypads into many different positions that best suit their individual computing needs and comfort. Additional input devices, such as a trackball, vertical function keys, digitizer tablet, and programmable-macro keys can either replace existing keypads or otherwise be added to the keyboard. This flexibility allows the Switchboard to evolve with the needs of the user and at the same time preserving desktop space due to the integration of all the Switchboard's modules into a single unit. Additionally, the Switchboard is the first keyboard that is engineered to work on both IBM and Apple computers. (input/output) **Call.**

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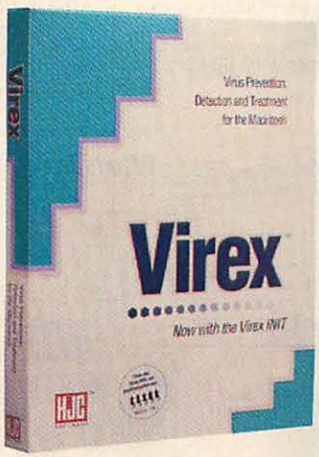
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LANGUAGES

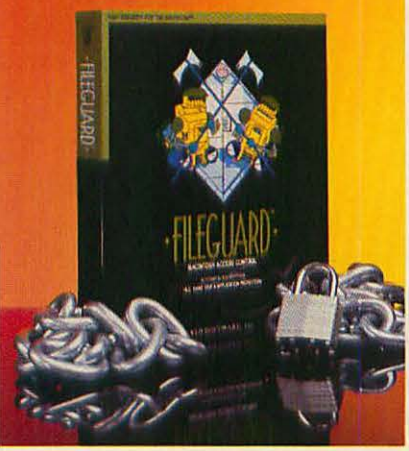
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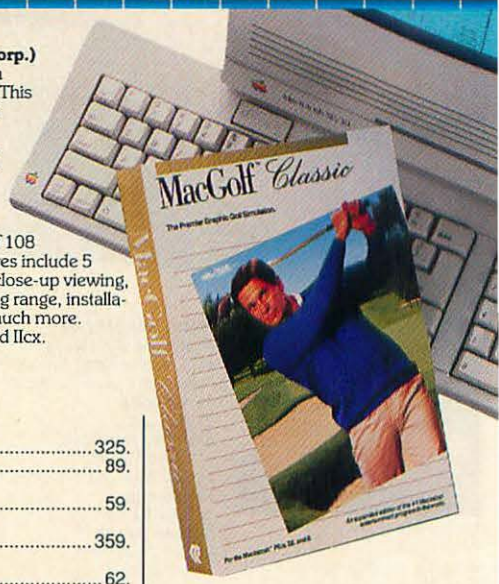
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Smartmodem 9600 (V series) 759.
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Supra
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Resonate
Listen 2.0 62.
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Sensible Grammar 53.

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StatView SE+Graphics 199.
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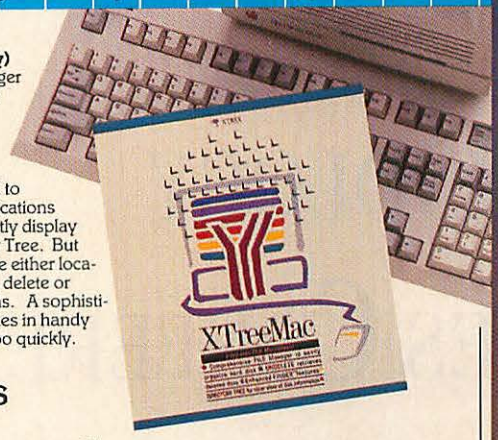


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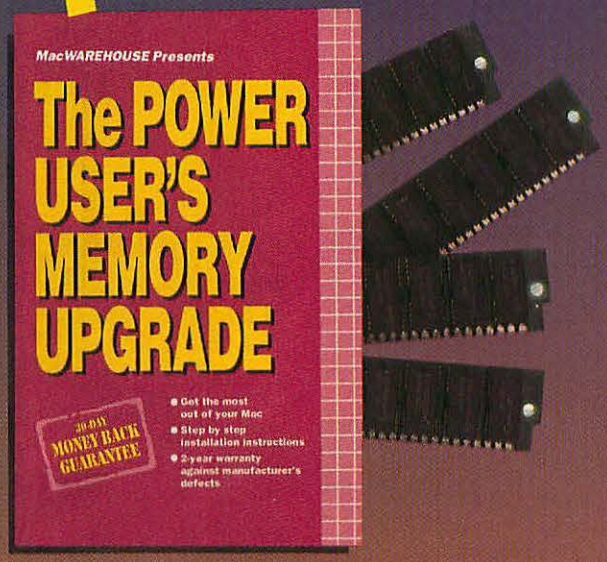
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CONTEST RULES 1. Entries must be received on or before 8/31/90. 2. Winner selected in random drawing by attorneys for MicroWarehouse Inc. (MWH), whose decisions are final. 3. Concorde trip to London and MacUser UK show subject to availability. MWH reserves the right to substitute wholesale cash value up to $8000. 4. Winner responsible for taxes. 5. Odds of winning depend on number of entries. 6. MWH will announce the winner on or around 9/30/90. Winner notified by mail. Dates subject to change at the discretion of MWH. If unable to contact winner, an alternate will be selected by random drawing. 7. Contest open to U.S. residents, except where prohibited by law. Employees of MWH and suppliers not eligible. 8. Prize: one round trip ticket to London, including NY-London by Concorde. Hotel accommodation for duration of MacUser UK Show, November 1990. $500 cash for miscellaneous expenses.

Circle 78 on reader service card

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Power User's Memory Upgrade
Unlock the awesome power in your Mac with a Power User's Memory Upgrade. By replacing the existing 256K chips with powerful 1MB memory modules you can upgrade your Plus or SE to 2.5MB or 4MB, or your Mac II type to 4 or 8MB.

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Join the thousands of Mac users who are taking advantage of todays low memory prices. You'll never have to quit your word processor just to answer a question from a spreadsheet again!

Install a Power User's Memory Upgrade and working with your Mac will never be the same again. Call and we'll help you select the right Memory Upgrade for your Mac.

Price per 1MB—$99 *

(For Mac Plus and SE models, upgrades must be installed in pairs. For the Mac II family, upgrades must be installed in groups of 4).

Two Page 19" Monochrome Monitor (Cutting Edge)
Every Mac SE and II user can now justify the expense of a big screen with the new Cutting Edge 19" Two Page Monochrome Display System. The Cutting Edge Monitor includes the interface card and matches just about all the features of other big screen display systems costing twice as much. It has a flicker-free refresh rate of 70 herz and a high resolution of 72 DPI. Like all Cutting Edge products it comes with a one year warranty and a 30 day money back guarantee. Please specify your Mac model when ordering. (hardware) **$959.**



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The Technology and Issues Conference brings together third-party Macintosh hardware and software developers for a series of informal sessions to discuss the latest issues concerning the Mac community.

The setting for this year's conference is Marriott's Tenaya Lodge, situated at the southern border of Yosemite National Park. Sessions will begin on June 27 and run through June 29, 1990.



To register to attend the *Macworld* Technology and Issues Conference, fill in the coupon and attach it to your check. Mail to: Technology and Issues Conference, *Macworld* Editorial, 501 2nd St., San Francisco, CA 94107. Registration is $695; a $100 discount applies if you register before April 1.

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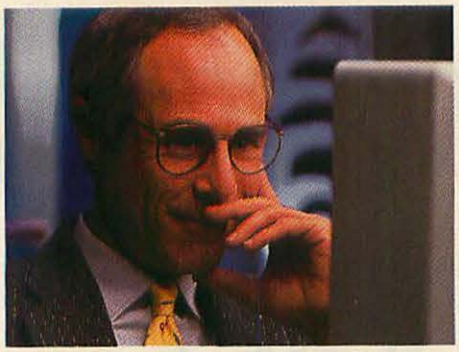
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☐ **Please send me more detailed information about the Technology an Issues Conference.**

There are two kinds of innovations in the computer business. The ones you just talk about. And the ones you actually use.

Introducing



The new Macintosh IIfx. 53 innovations, one powerful idea: to give you more power to do more things more easily than ever before.

Hardly a week goes by that you don't read a dramatic announcement touting one personal computer innovation or another.

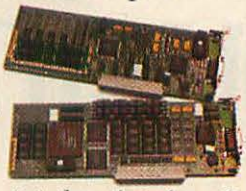
It all sounds impressive.

Until you actually sit down at a keyboard and try to convert all that hype into something practical.

This is what the remarkable new Macintosh® IIfx is all about.

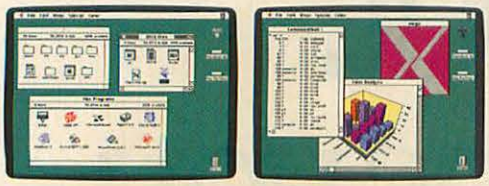
It is, by any measure, one of the most powerful personal computers ever built. Incorporating 53 major innovations, too many to list here. But a few merit special mention:

It is the first personal computer to offer a Motorola 68030 microprocessor running at 40 megahertz. In information processing terms, this is akin to a red Ferrari screaming down the autobahn with *Ride of the Valkyries* cranked all the way up on the stereo.



A pair of new video cards turns 18 new ideas from Apple labs into 16,776,960 more colors you can actually see. But only on a Macintosh.

It's also the first personal computer to have two additional processors to manage the flow of information inside. So that that screaming 68030 chip isn't slowed down by the more mundane tasks of computer housekeeping. And so that you aren't slowed down. Ever.



New A/UX 2.0 lets you run UNIX, X Window System and Macintosh personal productivity programs at the same time. 32 innovations for Apple, hundreds more choices for you.

It comes standard with 4 megabytes of memory and up to 160 megabytes of storage capacity. Plus six NuBus™ slots to let you expand its capabilities even more.

But what makes the IIfx truly powerful is that you can apply all of its 53 innovations to solving the problems you have today.

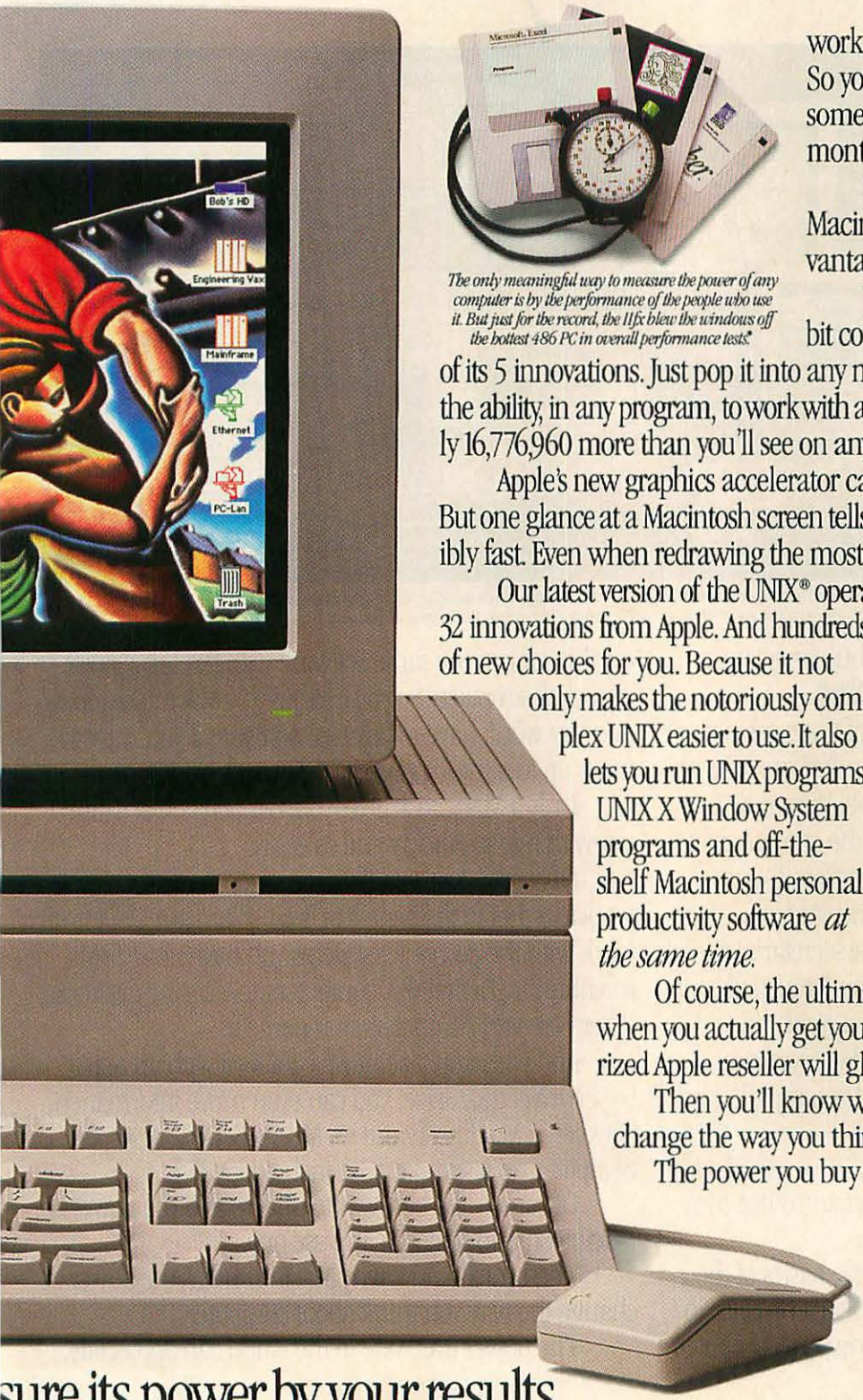
Because it is, above all else, a Macintosh.

It runs thousands of Macintosh programs that all

The new Macintosh IIfx. Mea

National Software Testing Laboratories ran benchmarks comparing the Macintosh IIfx with the IBM Model 70/486 running Microsoft Excel, Aldus Pagemaker and Adobe Illustrator. NSTL found the IIfx was 34% to 270% faster running these three popular programs, doing the things you normally do in business. In the same tests, the IIfx was also faster than the Compaq 386/33. The full NSTL test reports are available on request. Apple, the Apple logo, A/UX and Macintosh are registered trademarks, and "The power to be your best" is a trademark of

03 of the latter.



The only meaningful way to measure the power of any computer is by the performance of the people who use it. But just for the record, the IIfx blew the windows off the hottest 486 PC in overall performance tests.

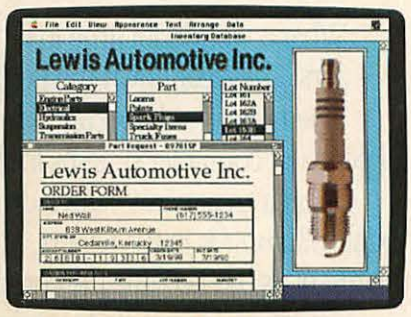
work in the same consistent, intuitive way. So you don't have to wait years for someone to write software for it. Or waste months figuring out how it works.

Still, the beauty of owning *any* Macintosh is how easily you can take advantage of the latest Apple ideas.

You can appreciate the new Apple® 24-bit color card without knowing anything of its 5 innovations. Just pop it into any modular Macintosh and you'll have the ability, in any program, to work with as many as 16.8 million colors (roughly 16,776,960 more than you'll see on any other personal computer).

Apple's new graphics accelerator card features a total of 13 innovations. But one glance at a Macintosh screen tells you all you need to know. It's incredibly fast. Even when redrawing the most complex CAD graphics.

Our latest version of the UNIX® operating system—A/UX® 2.0—represents 32 innovations from Apple. And hundreds of new choices for you. Because it not only makes the notoriously complex UNIX easier to use. It also lets you run UNIX programs, UNIX X Window System programs and off-the-shelf Macintosh personal productivity software *at the same time.*



The IIfx runs thousands of Macintosh business and education programs. So you can apply all its power to solving the problems you have today.

Of course, the ultimate test of any innovation comes when you actually get your hands on it. Something your authorized Apple reseller will gladly arrange.

Then you'll know why Macintosh has the power to change the way you think about computers.

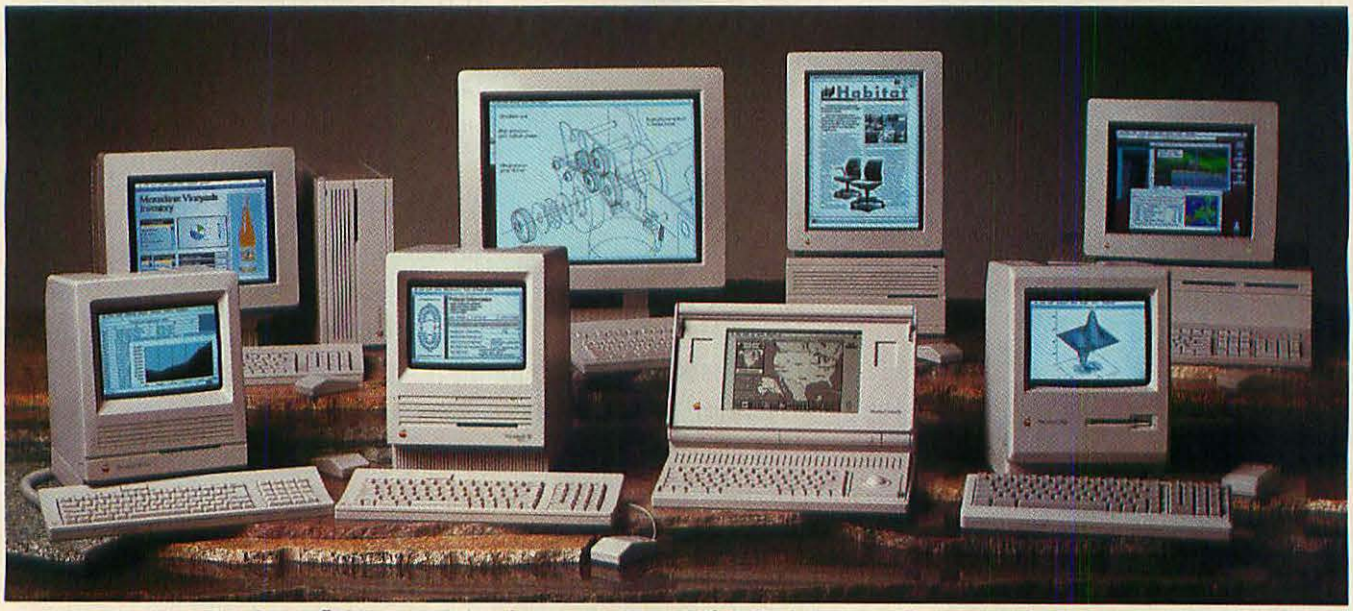
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From the most affordable Macintosh Plus to the awesome new Macintosh IIfx, Macintosh gives you more power to do more things more easily than any other personal computer system in the world. The only question is, how much power do you want?

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Then, Macintosh® becomes one of the most powerful personal computer systems in the whole world.

What a great way to start a decade. Humanity is in vogue. *Glasnost* is in the papers. And the computer for the rest of us has become the computer for all of us.

Scientists, engineers, teachers and students. CFOs, CEOs and CPAs. The sales force and the secretarial pool.

Anywhere you find people who prefer actually getting things done instead of figuring out rigid, intimidating computers. Which is to say, almost everywhere.

Why, even other personal computer companies are finally starting to see things our way.

But just as you can't expect the KGB to start picking up Nobel Peace Prizes, you can't expect any other computer to work like a Macintosh.

Only a Macintosh lets you learn the basics of thousands of different programs simply by learning one. So you spend a lot more time actually using your computer. And a lot less time figuring it out.

Only a Macintosh offers a whole family of computers that all run the same software with the same point-and-click simplicity. So you can buy any Macintosh today, and you won't have to buy new software if you want to move up to a more powerful Macintosh tomorrow.

Only a Macintosh gives you so much power to do so many things so quickly and so easily.

Of course, just as different economic systems can work together to the benefit of both, so too can Macintosh work with the computer systems you have now: IBM mainframes, Digital VAX computers, token-ring networks, other personal computers, you name it.

And with any Macintosh equipped with an Apple® SuperDrive™ disk drive, you can even move information between a Macintosh and an MS-DOS, OS/2 or Apple II computer on a standard 3½-inch floppy disk.

Of course, the best way to understand the power of Macintosh is to sit down and use one.

Then you'll know why Macintosh has the power to change the way you think about computers.

The power everyone in the world can appreciate.

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MACWORLD NEWS

by Dan Littman and Tom Moran

Radius Turns a Page in History

The Radius Pivot is a completely new category of product: a full-page gray-scale display that you can easily flip from vertical to horizontal and back again. Better yet, a mercury switch inside the 15-inch monitor senses the monitor's new position and reorients the on-screen display to portrait mode (for word processing or page layout), or to landscape mode (for spreadsheet work).

At present the mercury switch and Radius's Dynamic Desk software react only to the monitor's physical position. That means that although the display shows more of a spreadsheet when moved into landscape position, it does not, for instance, automatically bring the spreadsheet to the foreground. However, Radius says it has provided a software hook so that software developers can write utilities or applications that will be able to react appropriately when you tilt the monitor to either position.

A Control Panel program that comes with the Pivot monitor keeps lists of which applications require which window type. Users can easily add applications to the lists. The Pivot requires special programmable circuitry that ensures that its resolution remains at 72 dpi regardless of the monitor's current position. The company has applied for a patent on the new technology and is considering whether or not it will license it to other monitor manufacturers.



The Radius Pivot has a switch that senses a change in position, and software that automatically redraws the screen.

PHOTOGRAPHS BY PIERRE-YVES GOAVEC

The versatile monitor shows 640 by 864 pixels when in portrait mode, and 864 by 640 resolution while in its landscape mode. Its refresh rate is 69Hz and it displays 2 to 4 shades of gray with an upgrade to 16 shades available.

A final list price for the Pivot had not been set by press time, but the company said it would probably range around $1690. That price will include the graphics adapter board and the usual RadiusWare display utilities. For more information, contact Radius in San Jose, California, at 408/434-1010.
—T.M.

DataClub Joins Network Clique

A new network file-sharing package called DataClub presents shared files to users as if the files were on a single AppleShare server, but like TOPS, DataClub requires no server or dedicated Mac. Where TOPS presents a separate icon for each volume published on the network and users pick which volumes they want on their desktops, a single identical hard disk icon appears on all DataClub users' desktops.

To share files with other network users, you copy the files onto the DataClub volume. A networkwide Desktop file keeps track of everything put on the DataClub volume; if the Mac where your files actually reside is turned off, those files still appear, but grayed-out and unavailable to other DataClub users. To avoid such situations, you can decide where the information you put on the DataClub volume actually resides (it doesn't have to be on your disk), or even let DataClub choose the

(continues)

A Month From Now, Will You Be Appreciating Your New Accounting Software Or Depreciating It?

How can you be sure that the Macintosh accounting software you decide on becomes an asset instead of a liability?

See which packages have won the most industry awards for innovation, functionality, and ease-of-use. Make sure there is an 800# you can call when you have questions. (You might even call from the computer store you're shopping in, just to try it out.) Most importantly, determine that the accounting software you choose has the power and flexibility to meet your own business needs. And that it will grow with you.

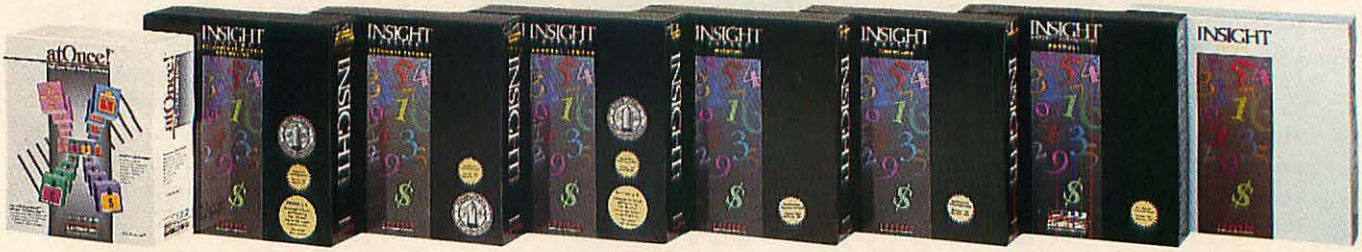
Follow those guidelines, and it is inevitable that you will buy an accounting software solution from LAYERED.

A month later, will you regret it? Impossible. Every LAYERED software package comes with an unconditional 30 days of absolutely free support. And that's something everyone can appreciate.

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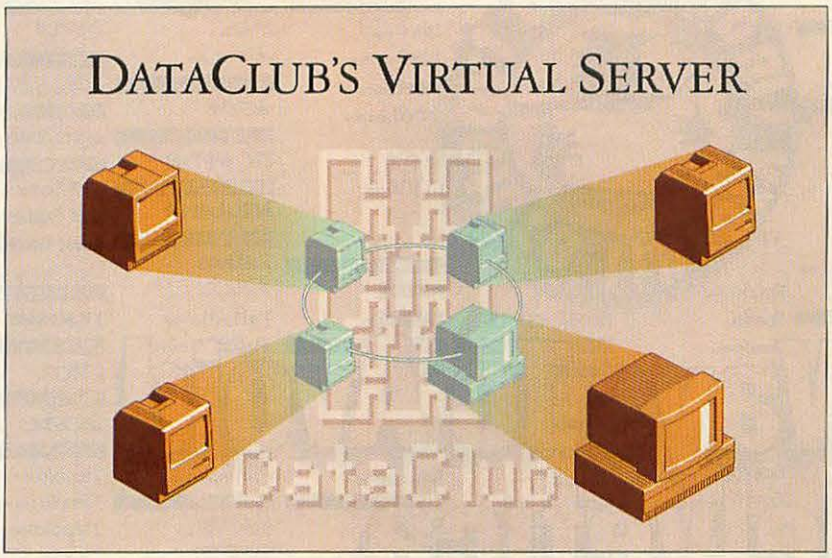
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Circle 128 on reader service card



DataClub integrates networked drives into a virtual volume, creating a unified desktop and distributing server functions across multiple machines.

most efficient place to store files. A special dedicated server version provides the same access controls as AppleShare and supports IBM PCs and multiple zones.

Company president Nick Powell says that adding users increases rather than degrades DataClub's performance, as more CPUs share the workload. DataClub's transport mechanism is built on a Structured Query Language (SQL) engine, and later the company will release a graphical tool kit for developing distributed processed SQL databases. No timetable for the introduction of database products was available at press time. DataClub costs $249 per machine, $499 for the dedicated server software; the administrator package, for setting up groups and access privileges, is $249. For more information, contact International Business Software in Sunnyvale, California, at 408/720-0364.
—D.L.

Aapps MicroTV Board: The Sequel in Living Color

Aapps Corporation's MicroTV board, among the hottest introductions at last August's Macworld Expo, now has a sequel: the Aapps Video Pro. (See *Reviews*, this issue, for more information on the MicroTV board.) Like its predecessor, the Video Pro displays a TV window on Mac II–series machines. However, the Video Pro sports a larger video window.

The VCR function lets you capture video sequences and replay and edit them as PICT2 files. The initial version of Video Pro will not support sound, however. It will allow scaling of the video window to 3 by 3½ inches, a larger size than is possible with the MicroTV board, and will display 128 levels of gray at 72 dpi.



This close-up shows the color version of the Aapps MicroTV.

Although details were not final at press time, Aapps says it is also working on an 8-bit color version, internally code-named Minnie Mouse. The color version will capture video frames in real time and support both the smaller and larger video windows, as well as the scaling of the Video Pro.

The Video Pro board will have a suggested list price of $595. Aapps will offer an upgrade, priced between $100 and $195, from the MicroTV to the Video Pro. Aapps expects to begin shipping the Video Pro and the color Minnie Mouse in time for the April Macworld Expo. The price of the color version had not been set at press time. For more information, call Aapps in Sunnyvale, California, at 408/735-8550.
—T.M.

Color Scanner Accepts Wide Variety of Film Formats

A series of hardware and software products announced in March by Barneyscan Corporation provides a wide range of desktop color-scanning and image-manipulation capabilities. Called Color Imaging Systems (CIS), the product family includes the CIS 4520, a multiformat production-scanning system that works with 35mm and 2¼-inch slides and film strips. It scans either positives or negatives in those sizes, and also accepts 4-by-5-inch transparencies or negatives.

Designed for high-volume production applications, the 4520 includes a 16MHz 80386SX microprocessor from Intel, a Motorola 56001 digital signal processor chip for real-time image processing, 8MB of RAM, and a 40MB hard disk. Because it has its own microprocessor, RAM, and peripheral storage, the 32-bit scanner can run automatically in the background, freeing up the Macintosh. The 4520 comes with CIS XP (formerly Barneyscan XP) extended image-processing software for retouching and making composite color images. Two new programs—CIS ColorAccess, color-separation software, and QuickScan, previewing software—also come bundled with the scanning system.

QuickScan lets you do a quick *(continues)*

Image Club Graphics PostScript Typeface Library

new VERSION 1.5 ATM COMPATIBLE!
Image Club Typeface Library is now available in Adobe Type 1 font format and compatible with Adobe Type Manager. Upgrades - $10 per font.

image club typeface library

599 Ways To Avoid Helvetica

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Badloc
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Baker Signet

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BALLOON BOLD
BALLOON EXTRA BOLD

BAMBOO (ATF)
Bamboo

BANCO
BANCO

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Barcelona BOOK
Barcelona BOOK ITALIC
Barcelona BOLD
Barcelona BOLD ITALIC

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Basilea

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Garamond STYLE ITALIC
Garamond STYLE BOLD
Garamond OLD STYLE BOLD ITALIC

ITC BERNASE ROMAN
Bernase ROMAN

BERNHARD TANGO (VGC)
Bernhard Tango WISWASH INIT

BISQUE (VGC)
Bisque

BOOGIE
Bolt BOLD

BOOK JACKET (VGC)
Book Jacket ITALIC

ITC CENTURY CONDENSED
Century BOOK COND.
Century BOOK COND. ITALIC
Century BOLD COND.
Century BOLD COND. ITALIC

CENTURY OLDSTYLE
Century OLDSTYLE
Century OLDSTYLE ITALIC
Century OLDSTYLE BOLD

CENTURY SCHOOLBOOK (ATF)
Century SCHOOLBOOK
Century SCHOOLBOOK ITALIC
Century SCHOOLBOOK BOLD
Century SCHOOLBOOK BOLD ITALIC

CHAMPAGNE (IC)
Champagne

ITC CHELTENHAM
Cheltenham BOOK
Cheltenham BOOK ITALIC
Cheltenham BOLD
Cheltenham BOLD ITAL
Cheltenham OUTLINE
Cheltenham OUTLINE SHAD.
Cheltenham CONTOUR

ITC CHELTENHAM CONDENSED
Cheltenham BOOK COND.
Cheltenham BOOK COND. ITALIC
Cheltenham BOLD COND.
Cheltenham BOLD COND. ITALIC

CHROME BUMPER (IC)
CHROME BUMPER

CITI (IC)
Citi LIGHT
Citi BOLD

CLAREDON (IC)
Claredon
Claredon BOOK

ITC CLEARFACE
Clearface REGULAR
Clearface ITALIC
Clearface BOLD
Clearface BOLD ITALIC
Clearface OUTLINE
Clearface OUTLINE SHAD.
Clearface CONTOUR

COMIC BOOK (IC)

Nouvarese BOOK ITALIC
Novarese
Novarese

COPPERPLATE GOTHIC (VGC)
ABCDE COPPERPLATE GOTHIC LIGHT
ABCDE COPPERPLATE GOTHIC

ITC KABEL
Kabel BOOK
Kabel MEDIUM
Kabel DEMI
Kabel BOLD
Kabel ULTRA
Kabel OUTLINE
Kabel CONTOUR

KAUFMAN SCRIPT (IC)
Kaufman Script
Kaufman Script

EUROSTIL EXTENDED (IC)
Eurostil EXT.
Eurostil BOLD EXT.
Eurostil EXT. OUTLINE
Eurostil BOLD EXT. OUTLINE

ITC NEWTEXT
Newtext LIGHT
Newtext LIGHT ITALIC
Newtext BOOK
Newtext BOOK ITALIC
Newtext REGULAR
Newtext REGULAR ITALIC
Newtext DEMI
Newtext DEMI ITALIC

AASE (VGC)

Ronda LIGHT
Ronda
Ronda BOLD

Franklin GOTHIC BOOK ITALIC
Franklin GOTHIC ITALIC
Franklin GOTHIC OUTLINE
Franklin GOTHIC OUTLINE SHAD.
Franklin GOTHIC CONTOUR

FRIZ QUADRATA (VGC)
Friz QUADRATA
Friz QUADRATA BOLD

FUTURA (FTN)
Futura LIGHT
Futura LIGHT OBLIQUE
Futura BOOK
Futura BOOK OBLIQUE
Futura MEDIUM
Futura MEDIUM OBLIQUE
Futura DEMI BOLD
Futura DEMI BOLD OBLIQUE
Futura BOLD
Futura BOLD OBLIQUE
Futura EXTRA BOLD
Futura EXTRA BOLD OBLIQUE

FUTURA CONDENSED (FTN)
Futura MEDIUM COND.
Futura MEDIUM COND. OBLIQUE
Futura DEMI BOLD COND.
Futura DEMI BOLD COND. OBLIQUE
Futura BOLD COND.
Futura BOLD COND. OBLIQUE
Futura EXTRA BOLD COND.
Futura EXTRA BOLD COND. OBLIQUE

GRAPHIX SHADOW

ITC GRIZZLY

Franklin GOTHIC BOOK ITALIC

Hairline
hairlin HAIRLINE

HARRY (VGC)
Harry THIN
Harry PLAIN
Harry FAT

HEADLINER (IC)
HEADLINER
HEADLINER OUTLINE

HALLMARK (IC)
Hallmarke LIGHT
Hallmarke LIGHT ITALIC
Hallmarke BLACK
Hallmarke BLACK ITALIC

HALLMARK CONDENSED (IC)
Hallmarke LIGHT COND.
Hallmarke LIGHT COND. ITALIC
Hallmarke REGULAR COND.
Hallmarke REGULAR ITALIC
Hallmarke BOLD COND.
Hallmarke BOLD COND. ITALIC
Hallmarke BLACK COND.
Hallmarke BLACK COND. ITALIC

ITC FAT FACE
FatFace

ITC FENICE
Fenice REGULAR
Fenice REGULAR ITALIC
Fenice BOLD
Fenice BOLD ITALIC

INDUSTRIAL PRESS (IC)
INDUSTRIAL

ITC ISBELL
Isbell BOOK
Isbell BOOK ITALIC
Isbell BOLD
Isbell BOLD ITALIC

LYNZ
LYNZ GREY

L&C Hairline

ITC MACHINE
MACHINE
MACHINE BOLD

MAXIMUS

Mezzo BOLD

MICR (IC)

EXT

ABCDE MICROGRAM NORMAL
ABCDE MICROGRAM BOLD
ABCDE MICROGRAM BOLD OUTLINE

MICROGRAM EXT & COND (IC)
MICROGRAM COND.
ABCD MICROGRAM EXT.
ABCD MICROGRAM BOLD EXT.
MICROGRAM COND. OUTLINE
ABCD MICROGRAM EXT. OUTLINE
ABCD MICROGRAM BOLD EXT.

ITC MILANO ROMAN
Milano Roman

MINI PICS (IC)
MINI-PICS

MISTRAL
Mistral

ITC MIXAGE
Mixage BOOK
Mixage BOOK ITALIC
Mixage BOLD
Mixage BOLD ITALIC
Mixage BLACK
Mixage BLACK ITALIC

ITC MODERN NO. 216
Modern NO. 216 LIGHT
Modern NO. 216 LIGHT ITALIC
Modern NO. 216 BOLD
Modern NO. 216 BOLD ITALIC

Modern NO. 216 HEAVY
Modern NO. 216 ITALIC

MURRAY (IC)
Murray
Murray BOLD

NEON (IC)
NEON

ITC NEON
ITC NEON

NEULAND
NEULAND

PALLADIA (IC)
Palladia
Palladia ITALIC
Palladia BOLD
Palla BOLD ITA

Panache BOLD ITALIC

PAPER CLIP (VGC)
PAPER CLIP
PAPER CLIP OUTLINE
PAPER CLIP SOLID

PARK AVENUE (ATF)
Park Avenue

PEIGNO (IC)
PEIGNO LIGHT
PEIGNO BOLD

ITC PIONEER
PIONEER

PLAYBILL
Playbill

POINTILLE (VGC)
POINTILLE

IVY LEAGUE (VGC)
IVY LEAGUE
IVY LEAGUE OPEN

COMMERCIAL SCRIPT (ATF)
Commercial Script

COMPACT (IC)
Compact LIGHT
Compact
Compact BOLD

COOPER BLACK (ATF)
Cooper BLACK
Cooper BLACK ITALIC

FOLIO (FTN)
Folio LIGHT
Folio MEDIUM
Folio BOLD
Folio EXTRA BOLD

FRAKTUR
Fraktur

SALTO
Salto

SAVAGE (IC)
Savage

SCANNING (IC)
SCANNING

SCOTFORD UNCIAL (VGC)
SCOTFORD UNCIAL

ITC SERIF GOTHIC
Serif Gothic REGULAR
Serif Gothic BOLD
Serif Gothic BLACK
Serif Gothic BOLD OUTLINE

TH ALPHABET SOUP (VGC)
T.H. ALPHABET SOUP

THOR (VGC)
THOR

THUNDERBIRD
ABC THUNDERBIRD

ITC TIEPOLO
Tiepolo BOOK
Tiepolo BOOK ITALIC
Tiepolo BOLD
Tiepolo BOLD ITALIC
Tiepolo BLACK
Tiepolo BLACK ITALIC

ITC TIFFANY
Tiffany LIGHT
Tiffany LIGHT ITALIC
Tiffany MEDIUM
Tiffany MEDIUM ITALIC
Tiffany DEMI
Tiffany DEMI ITALIC
Tiffany HEAVY
Tiffany HEAVY ITALIC

ITC TOM'S ROMAN
Tom's Roman

TOO MUCH (VGC)
TOO MUCH OPAQUE
TOO MUCH CLEAR
TOO MUCH SHADOW

TRIUMPH (IC)
Triumph
Triumph ITALIC
Triumph BOLD
Triumph BOLD ITALIC

UNIFORM CONDENSED (IC)
Uniform 47
Uniform 48
Uniform 57
Uniform 58
Uniform 67
Uniform 68
Uniform 39
Uniform 49

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This ad was created on a Mac II using Aldus PageMaker 3.02, Adobe Illustrator 1.83, Silicon Beach Digital Darkroom. The text was set with the Futura & Futura Condensed families from the Image Club Typeface Library and output as negatives on a Linotronic L300 PostScript imagesetter.

600 Typefaces

Too many fonts for one page! This is the Image Club PostScript Typeface Library. We've developed 600 licensed typefaces in Mac or PC format for use with any PostScript printer. Fonts are available on diskettes, on the LetterPress™ CD ROM (which contains our entire library of 600 fonts), or on the Art&Type™ Vendor CD ROM.

Desktop Type Store

The Art&Type Vendor CD ROM uses a special program to unlock typefaces and clip art from the CD ROM as they are required. The Vendor costs $199 and includes 20 fonts and 1 volume of Digit-Art™ EPS clip art. Buying additional fonts or clip art from the Vendor is as easy as making a toll-free phone call. Image Club will provide an access key that unlocks the fonts or clip art images from the CD ROM. With the Art&Type Vendor you'll never miss another deadline waiting for a font to arrive.

Macintosh Version

Image Club fonts include both type 3 and type 1 PostScript fonts which guarantees compatibility with virtually any Macintosh application including Adobe Type Manager™ (ATM). With ATM you can print Image Club type on non-PostScript printers such as an ImageWriter or a LaserWriter 11SC. Our fonts also include PostScript artwork files. With Illustrator™ or Freehand™ you can customize characters, creating unique type-based designs.

PC Version

Image Club type is compatible with Ventura™, PageMaker™ (Windows) and Corel Draw™ for use with any PostScript compatible printer. Image Club fonts will work with non-PostScript printers like an HP LaserJet™ when combined with PostScript software such as PreScript™, Freedom of Press™ or a PostScript card.

Prices & Discounts

Whether you buy fonts on diskette, from the Art&Type Vendor CD ROM, or the whole library on the LetterPress CD ROM, our pricing and discount schedule make it easy.

Each font $25. Minimum purchase $50.

Please note that typeface families cannot be split up.

Discount schedule:

10-30 fonts 20% off	131-210 fonts 35% off
31-70 fonts 25% off	211-300 fonts 40% off
71-130 fonts 30% off	

CD ROM

Letterpress CD ROM full disc (all 600 fonts)	$4999
Letterpress full disc with NEC CD ROM drive	$5399
Art&Type Vendor CD ROM	$199

(Includes 20 fonts and 1 volume of PostScript Digit-Art™ clip art)

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black-and-white scan and then choose just part of an image or a smaller size for the entire image. The program saves processing time and storage space because you avoid scanning the entire image at its highest resolution and depth of color. You can also adjust the brightness and contrast before doing the final scan.

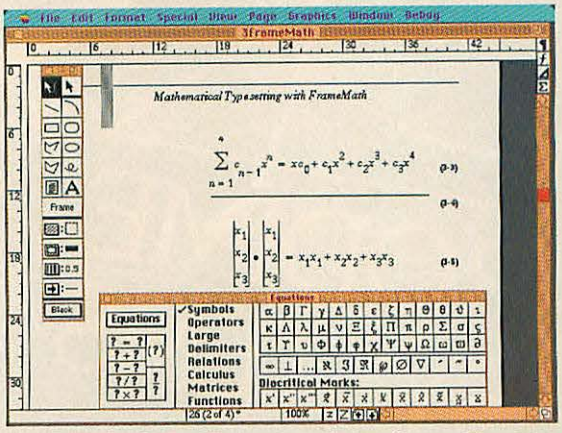
Barneyscan also introduced CIS Gallery, image-cataloging software that lets you organize scanned images. Gallery creates thumbnails, smaller versions of 8-bit or 24-bit PICT images, and lets you title them and enter data about where the image is stored, who owns the rights to it, and so forth. Gallery comes with a master program for creating the image database, and a version that lets users search, but not change, the database.

Barneyscan also changed the name of its existing Barneyscan 24-bit scanner, now called the CIS 3510. The 3510 retails for $9495, including CIS XP and QuickScan. The 4520 production scanning system should have a suggested retail price around $27,995 including XP, QuickScan, and ColorAccess. It is slated to ship in the second quarter. Gallery will probably list for around $695 for a master pack and two run-time versions. Additional run-time versions will cost about $199 each. Availability for Gallery and ColorAccess was not finalized at press time, but both products were expected to ship sometime in the second quarter. For more information, contact Barneyscan in Alameda, California, at 415/521-3388. **—T.M.**

FrameMaker Makes the Scene

The long-awaited Mac version of the technical-document processor FrameMaker is about to ship, and Frame Technology says it will be feature- and file-compatible with FrameMaker 2.0 on UNIX systems such as Sun and Next machines. It does word processing, page layout, and object-oriented graphics, has an equation processor and math typesetter, and provides tools for creating and managing long, complex documents across a network of mixed Macs and UNIX machines.

You can create FrameMaker pages as highly structured templates; change a completed page's template and FrameMaker will rework the page to match. Type style controls are like Word's Style Sheets but without Word's hierarchical Next Style/Based On structure. Character and paragraph formatting work independently, and formats can be as detailed as placing the first paragraph of each chapter a certain distance from the top of a right-hand page. You can search and replace for almost anything, even index markers, TeX tags, and letter kerning.



FrameMaker's math typography and equation processing, with context-sensitive color palette.

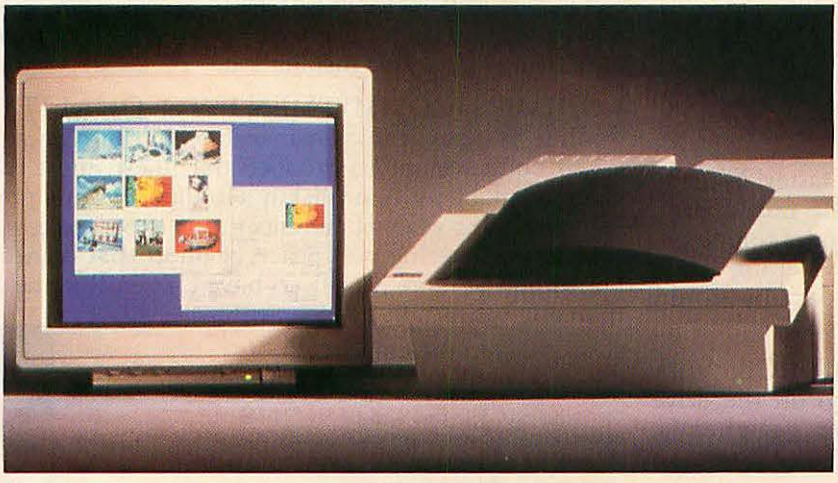
Features for long and complex documents include the following: if you delete a footnoted item, its footnote disappears and remaining footnotes renumber themselves (tables of contents, cross-referencing, and index-generation have similar intelligence). You can thread multiple files side by side for a few pages and then jump them to different pages; using variables, your *continued on page xyz* markers update automatically when you make a change. Variables are also useful for tasks like copying the first and last line of a page into the header, as is commonly needed for telephone directories and dictionaries.

FrameMaker's math processing and typography abilities are impressive. Its calculating capabilities match Milo's (it was written by the same programmers), and it can display expressions either in-line as Mathematica does or in an intelligent WYSIWYG mode. Clicking on an expression selects terms of an expression based on the math underlying the expression, and you can then calculate the term or change its formatting.

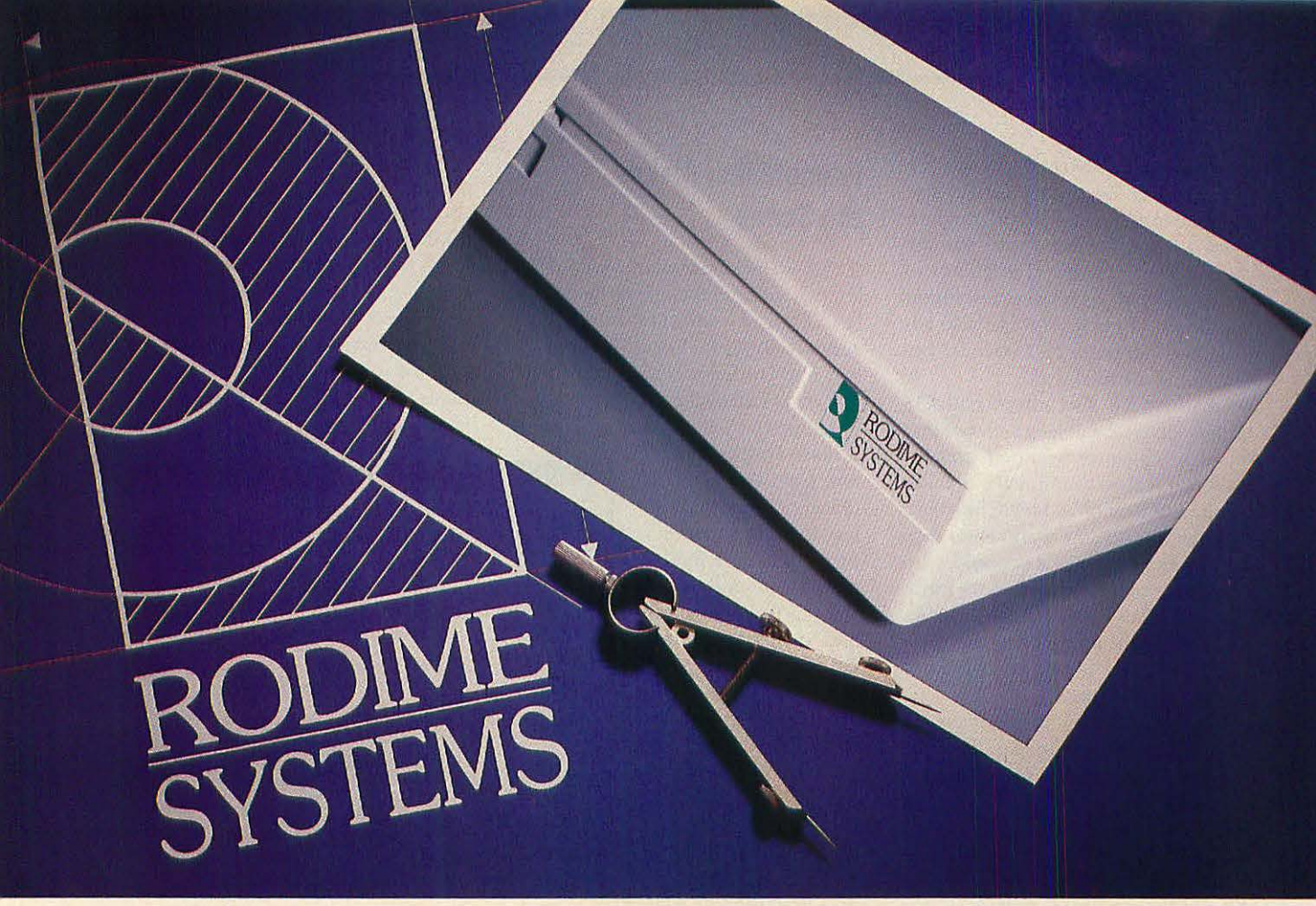
FrameMaker has a few limitations. It can't handle four-color art (it does create spot-color separations), its graphic design features are about as good as MacDraw's, text-wrap around graphics is tedious manual labor, and all pages in a document must be the same size.

FrameMaker will list for $999. For more information, contact Frame Technology in San Jose, California, at 408/433-3311.**—D.L.**

(continues)



The Barneyscan CIS 4520 high-end scanning system can accept a wide variety of sizes of color film and transparencies.



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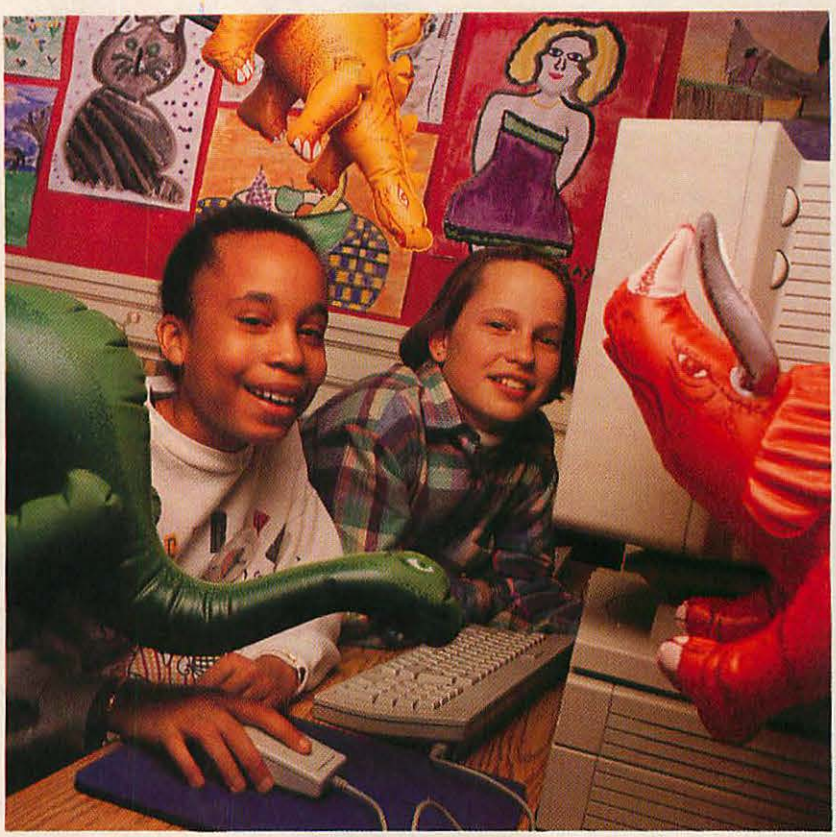
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SYSTEMS

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Computers for a New Classroom Culture?

Why did the dinosaurs disappear, leaving us with nothing but fossils and controversy over their fate? Fifth graders at Toronto's Huron School dove right into this debate. First, they watched a videotape presenting facts and hypotheses to explain the great beasts' extinction. After discussing the tape, the students recorded other facts, hypotheses, and their own questions and research in a shared database on eight Mac IIx's. They commented on each other's notes and concluded that an asteroid striking the earth had caused a fire storm and vast smoke clouds that did the dinos in. The students then submitted facts and hypotheses to a IIx running ECHO (Explanatory Coherence by Harmony Optimization), a program that evaluates the coherence of arguments by treating the connections between ideas as mathematical constraints. ECHO's conclusion: an ice age provides a more coherent explanation for the dinosaurs' disappearance. The students then produced a stronger version of the asteroid theory, including additional facts such as the layer of soot in the earth's geological record.

According to Carl Bereiter and Marlene Scardamalia, who designed this educational experiment, these fifth-graders were learning to reason about the relationship between facts and hypotheses at a level above that of most university students. Bereiter and Scardamalia, cognitive psychologists at the Ontario Institute for Studies in Education, want to transform classroom culture to encourage active intellectual pursuit over rote memorization, and collaboration over competition. They are part of a team of 50 psychologists, teachers, computer scientists, and graduate students creating CSILE (Computer Supported Intentional Learning Environment), a general-educational software package for use with all curricula at all grade levels. Though CSILE will not be commercially available for three more years, Apple has donated 17 Mac IIx's and consulting help to the project to ensure that it runs on the Mac.



WALLY MOSS

These fifth graders are sharing a database that convinced a logic-analysis program of their explanation for dinosaurs' disappearance.

Bereiter and Scardamalia expect the final system to include support for CD ROM, interactive videodiscs, information services, *microworlds* (computer-simulated environments), and E-mail service to volunteer experts. A high school will try CSILE next year, and university experiments will follow.

For further information, contact the Center for Applied Cognitive Science at OISE, 252 Bloor St., Toronto, Ontario, Canada, M5S 1V6.

—Ann Garrison

Scitor Enters Mac Project-Management Market

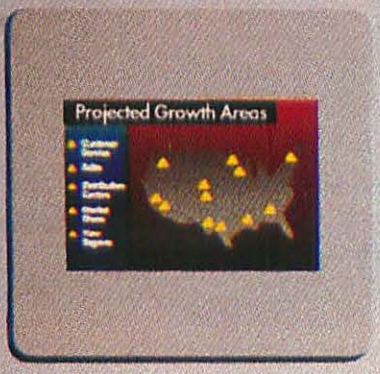
Scitor's Project Scheduler 4 (PS4) departs from most project-management packages that run on the Mac in its use of the industry standard Work Breakdown Structure (WBS) and Organization Breakdown Structure (OBS) codes. WBS coding is a tightly structured method of numbering tasks and subtasks; OBS allows an organization—for instance, a subcontractor working on part of a larger project—to superimpose its own numbering scheme on a project that is already numbered. Like an outline, WBS and OBS codes are useful for generating reports showing different levels of detail.

PS4 can open multiple projects at once and can consolidate project status information temporarily to study cost curves, labor allocation, and other resources that come from a common pool. You can schedule a project backward, if necessary, beginning with a must-finish date and finding the latest start.

You can set up what-if scenarios with weighted best-case, reasonable, and pessimistic schedules, or estimate how much a project will slip based on percent completed of critical tasks. PS4 can perform automatic resource leveling and provides interactive resource leveling in a Gantt format. Side-by-side Gantt charts and histograms can pinpoint slipping schedules and overallocated resources, and you can modify either on the fly.

(continues)

HAVE YOU WRITING ON



You can't judge a slide on a light table. To see how sharp it is, you've got to blow it up on the wall.

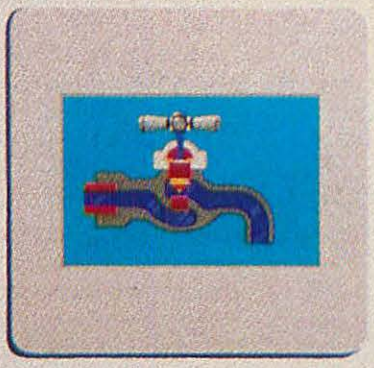
Which is what we've done here. You're looking at a real slide, created with a MATRIX® film recorder, and projected onto a 4'x 4' screen.

Look closely. And ask yourself: Do my slides look this good?

If not, then it's time to consider a MATRIX film recorder from Agfa.

To give you a sharper image, we use a seven-inch picture tube–the largest in the industry–along with up to 8,000 lines of resolution. Our color wheels are ground to military specifications, and carefully mounted to minimize distortions.

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ProColor® to the new, professional Forte™. With Conductor™, our image management soft-

SEEN THE THE WALL?

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×			Minor File Repair
×	×		Disk Protection
×	×		Hard Disk Crash Recovery
×	×	×	**Hard Disk Backup**
×		×	Multiple File/Folder Selection
×		×	Data Compression
×		×	Multiple Setup Files
×			**File Locator DA**
×	×		**Hard Disk Partitioning**
×			Automount w/Password Prompt
×	×		**Hard Disk Optimization**
×			Complete Disk Erase
×			Color Disk Map
×	×		**Secure/Encrypt File**
×			Desk Accessory
×	×		**Fast Floppy Copying**
×			**File Management**

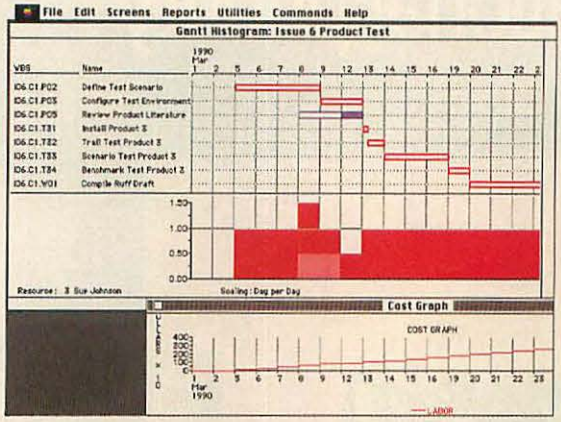
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Beginners can set the online help to Verbose, which delivers a constant stream of prompts and information as Excel 2.2 does. There is also a Terse setting for experienced users. Full documentation is available online, and there are tools for analyzing mistaken assumptions after a project is completed.



A Gantt histogram and cost graph in Project Scheduler 4. You can reassign resources from this view.

PS4 documents for the Mac and the IBM PC are file compatible, but PS4 lacks the record-locking capabilities that would permit a group of people to work together on one project across a network. Each project is limited to 500 resources and 2000 subtasks, but you can merge data from other projects into a master file.

Pricing was undecided at press time, but Scitor says PS4 for the Mac will cost about the same as the PC version, which lists for $685. For more information, contact Scitor in Foster City, California, at 415/570-7700.—**D.L.**

Coprocessor Board Provides Blazing CAD/CAM Performance

A coprocessor board for Mac II computers can boost graphics performance on the system to beyond that of a DECstation 2100 minicomputer. The board, developed by YARC Systems Corporation and called the NuSuper, is easily installed in any Mac II computer. This isn't the type of board that you'll want to use for super-high-speed word processing. Instead, expect to use it for computer-aided design, intense number crunching, and other compute-intensive applications.

The board performs its magic using a RISC chip, the AMD 29000. This chip is designed to optimize specific computing operations without the need for the system management tasks of a typical coprocessor used in the Mac. The NuSuper board runs CAD/CAM tasks completely in parallel while the Mac continues with its usual tasks. File I/O, printing, video display, and other standard computer tasks are handled by the Mac's 68020 or 68030 processor as usual. Meanwhile, the hard-core data-crunching is done by the NuSuper board.

The NuSuper runs under the Finder or MultiFinder. Under MultiFinder, you can use up to four NuSuper boards simultaneously. The boards act as bus masters, directly accessing Mac memory and peripherals.

The improved performance comes at a price, however. In addition to the $3595 list price for the basic board with 2MB of RAM, you have to find or modify software to run on the coprocessor. Since the 29000 processor uses its own instruction set, it can't run standard off-the-shelf Mac applications. Another version of the board includes a floating-point math coprocessor and lists for $4295.

YARC Systems offers a software development environment called NuSuper S/W, which incorporates a Mac II assembler, linker, and debugger. Options include a native C compiler that lets you compile C programs to run on the coprocessor, and a FORTRAN compiler that generates native code from FORTRAN programs.

The latest version of the NuSuper coprocessor supports up to 10MB of cache memory in the form of SIMMs that you add to the board. It can address up to 32MB of Mac memory. For more information, contact YARC Systems Corporation in Agoura Hills, California, at 818/889-4388.

—**Mark Brownstein**

RenderMan's Red Carpet

Award-winning computer animation like *Tin Toy* and *Red's Dream* has propelled RenderMan to Hollywood superstar status, but Pixar's photo-realistic image-rendering standard is really just a few al-

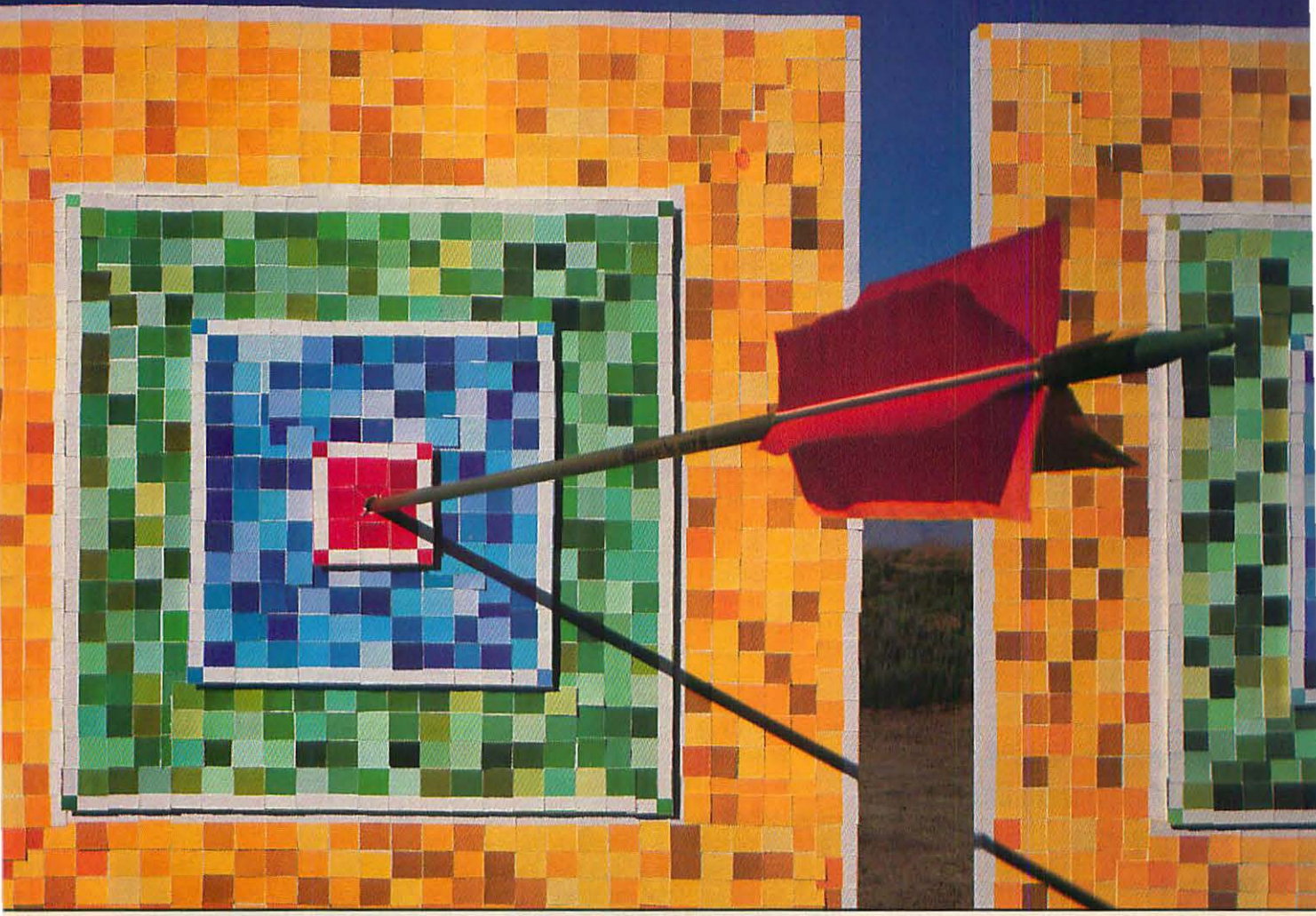
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JOHN GREENLEIGH

The YARC NuSuper coprocessor board includes a RISC microprocessor that accelerates CAD/CAM performance on the Mac II series.

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Circle 196 on reader service card

gorithms and a design spec. Several Mac companies are scrambling to implement RenderMan capability, among them Dimensions Presenter publisher Visual Information Development (VIDI).

Pixar wants to make RenderMan the standard for rendering three-dimensional designs as photo-realistic objects. It works essentially by applying special shaders to 3-D objects—for example, a Displacement shader could take the form of a thread; wrap it around a steely tube, and you've got a bolt. Or an Atmosphere shader might fill a room with smoke, dust, or shadows. Photo-realism lets engineers convert 3-D mechanical designs into palpably hard, metallic images for clients. In other uses, such as textile or package design, Texture Map shaders of fabric or paper could save time and money by eliminating the prototype stage.

VIDI's Dimensions Presenter imports files from a companion 3-D modeling package, Design Dimensions (and from many other 3-D packages), and renders finished images for presentation as animations or slide shows. Presenter can render images with flat shading, which uses many flat polygons to simulate curved surfaces; by applying smooth shading to curved surfaces; and by mapping textures and images onto objects. But RenderMan's language for creating shaders will make it possible for third-party developers such as VIDI to create a wide variety of very sophisticated shaders for use almost like fonts on a PostScript printer.

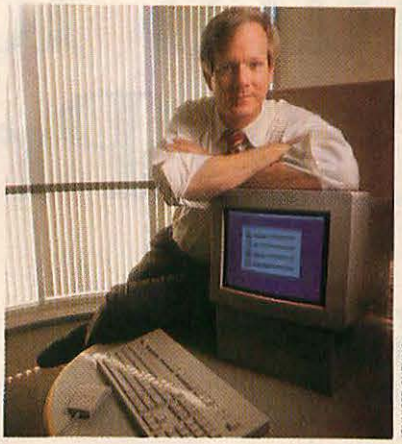
Presenter also has an add-on module for *ray tracing,* a technique that calculates reflected light to create stunning images. Rendering takes a lot of hardware (see related story, "Coprocessor Board Provides Blazing CAD/CAM Performance"), but ray tracing, especially with multiple objects and multiple light sources, becomes extremely computation-intensive, and some RenderMan Reflection or Environmental shaders give a good approximation of ray-traced output with less overhead.

Design Dimensions lists for $1595, Dimensions Presenter for $595, and RayTrace for $995. Pricing for the RenderMan module was undecided at press time. For more information, contact VIDI in La Puente, California, at 818/918-8834.—**D.L.**

Norton Utilities: Today I Am a Mac

No pen-and-pencil set this, but a set of disk utilities for the Mac from Peter Norton Computing, famous for its MS-DOS disk utilities. Norton has fully implemented the Mac interface for the new product, so that all the utilities are reached by pushing buttons within the color interface. Called The Norton Mac Utilities, the package comprises Norton Disk Doctor, which repairs damaged disks; UnErase, which retrieves deleted files; Format Recover, which helps recover files after a hard disk has been unintentionally reformatted; and SpeedDisk, a disk-optimizing module.

Other utilities include Layout, which lets you customize the Finder; Fast Find, a high-speed search engine; KeyFinder, a table of special font characters; and Directory Assistance, which lets you find files, view files, delete files, and create new folders from within any application. Fast Find can search the data on a full 40MB hard disk in 4 seconds, according to Peter Norton Computing, and you can double-click to launch a file from within the module. The search engine works with System 4.2 and System 6.0.x. For advanced users, there's Disk Editor, an additional data-recovery module that lets you map bad disk sectors and take different views of the data.



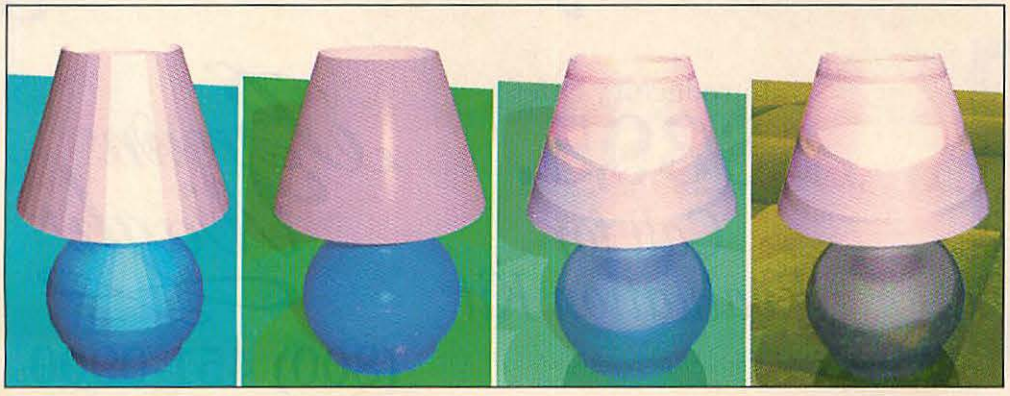
JENNIFER CHEUNG

Peter Norton shows off his first product for the Macintosh, The Norton Mac Utilities.

The UnErase and Format Recover modules are both helped by the fact that The Norton Mac Utilities package makes a copy of the directory structure and keeps a separate file to track the physical location of all the files. You can choose which files or volumes you want to back up in this way.

Expected to start shipping in March, The Norton Mac Utilities will have an introductory list price of $99. For more information, contact Peter Norton Computing in Santa Monica, California, at 213/319-2000. —**T.M.**

(continues)



A Design Dimensions image with: (1) flat-shading; (2) simple ray-tracing; (3) ray-tracing, mirroring, and a translucent lamp shade; (4) ray-tracing, a pattern Studio 8 mapped to the lamp base, and a texture mapped to the background.

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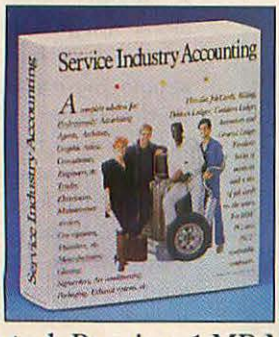
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JOHN GREENLEIGH

From left to right, Hewlett-Packard's Macintosh versions of the latest LaserJet III, the versatile LaserJet IID, and the compact LaserJet IIP.

Hewlett-Packard Goes Mac

Leading printer-maker Hewlett-Packard recently announced Mac versions of all its laser printers and simultaneously introduced the LaserJet III, a high-resolution replacement for its hugely successful LaserJet II. The long-awaited Mac-compatible printers are the same as the company's printers for the IBM PC environment but add an AppleTalk connector, a memory-upgrade board, and a font cartridge that provides the PostScript language. HP also developed a Chooser-level driver that's included with the new printers.

The three hardware components and the driver will also be available as an easily installed upgrade kit for existing LaserJet-series printers, so that the large installed base of networked HP printers will now be able to support either Macs or PCs (but not both at the same time). The printers need to have 2MB of RAM to run PostScript, and the LaserJet IID for the Macintosh requires 4MB to print on both sides of the page.

The LaserJet III prints 8 pages per minute using a technique HP calls Resolution Enhancement. The patented technique makes use of different size dots to avoid aliasing, resulting in smoother lines. The LaserJet IID can print on both sides of the page and comes with two paper trays with a total capacity of 400 sheets. The IID also produces 8 pages per minute and can accommodate an optional envelope feeder. The LaserJet IIP is a smaller, less expensive device that prints at 4 pages per minute. The Macintosh versions of these printers all add "for the Macintosh" to their names.

Hewlett-Packard has scheduled the LaserJet III to begin shipping on March 1. The Macintosh versions of the LaserJet III, the LaserJet IID, and the LaserJet IIP should be available in the second quarter. The LaserJet IID for the Macintosh will have a list price of $5360 with 2MB RAM or $6060 with 4MB. The LaserJet III for the Macintosh will list for $4355, and the LaserJet IIP for the Macintosh will be priced at $3455. All of these prices include PostScript.

For those who wish to upgrade from other LaserJet models, the AppleTalk interface lists for $275, the HP PostScript cartridge for $695, and the 2MB memory board for the IID and the IIP has a list price of $990. Memory boards for the III list for $1495 for 4MB and $795 for 2MB. For more information, call the Hewlett-Packard customer-information number, 800/752-0900. In Canada, call your local HP sales office. —**T.M.**

Now Hear This

ProtoTyper publisher SmithersBarnes is changing its name to Now Software and jumping into the utilities business with ScreenLocker, a combination screen-blanker and security tool, and Now Utilities, a dozen utilities that include some former shareware programs packaged with some neat new hacks.

Like DiskTop, Now Utilities provide capabilities that Apple should have built right into the Mac. (The Now feature set doesn't overlap DiskTop's.) For example, NowMenus (known to shareware users as HierDA or MenuDA) is an INIT that creates a hierarchical Apple menu and lets you access the menu bar anywhere on screen; Print Previewer is a Chooser device that does just what its name suggests—in all applications; MemorySetter is useful for setting a temporary memory allocation for an application (especially useful for running off locked volumes such as CD ROMs and AppleShare servers). Other tools give you access to unselected windows in the Finder, WYSIWYG font menus, a way to modify the Finder's appearance



Print Preview, one of Now Utilities' 12 tools, gives you WYSIWYG printing in all applications.

without resorting to ResEdit, control over uncooperative INITs, and more.

ScreenLocker poses no challenge to AfterDark's exotic screen savers, but it provides some extra security features. When ScreenLocker comes on, your screen remains locked until you give it the correct password, and the screen locks again when you restart your Mac (though booting from a different disk side-steps the screen lock). While displaying the date, the time, a message, or a black-and-white picture (color support will be added in an upgrade), ScreenLocker keeps a log of every attempt to bring the screen back to normal.

ScreenLocker will list for $99, and Now Utilities will list for $179. For more information, contact Now Software in Portland, Oregon, at 503/274-2800.—**D.L.**

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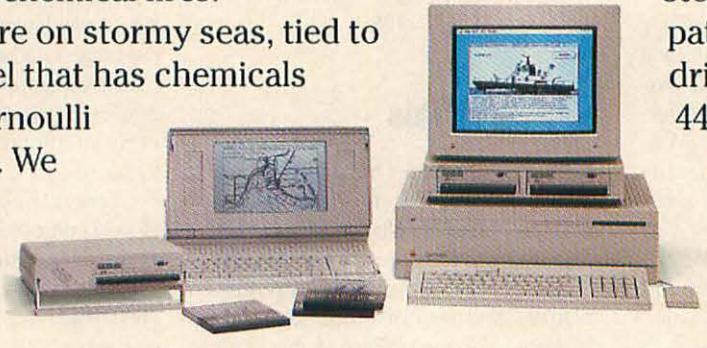


"Six-foot breakers, collisions with distressed vessels, constant dampness — it's not exactly a friendly, office-computing environment."

According to Robert Hope of the Seattle Fire Department, it takes rugged hardware to weather the operating conditions on the Chief Seattle fireboat. But they've got a security and storage system that definitely has sea legs.

"Bernoulli® is tough," says Hope. "And it has to be. Because our Bernoulli stores critical handling and extinguishing procedures for chemical fires."

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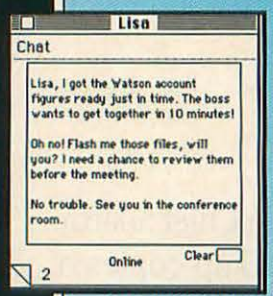
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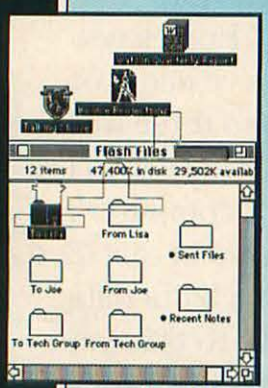
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Flash is the fastest, friendliest file transfer program you can buy for the Macintosh. Unleash the power® of your AppleTalk network with Flash.

Quickly send files and messages to any other Macintosh—or group of Macintoshes—on the network. Flash even has a chat mode that lets you talk in real-time to anyone else.



Both people type into the same note pad when chatting.



To send files to a person or group, just drop them in a folder.

Flash is Fast

- To send a file, just drop it into a Flash folder and off it goes!
- All file transfers are done in the background, so you never have to wait. Flash works while you do.
- Flash's transfer rate is almost 1MB per minute. Most files are sent in seconds.

Flash is Powerful

- Flash can send and receive any combination of files and folders at the same time.
- The contents of an entire hard drive can be transferred—while you use both computers!
- Flash can communicate across any AppleTalk network zones that also have Flash installed.

Flash is Friendly

- Flash is perfectly integrated into the Macintosh desktop environment.
- Installation is so easy you'll be *using* Flash in minutes—not just reading about it!
- You can use Flash anytime, from inside any application.
- Flash tells you when your files arrive, so there's no need to keep checking. But, in case you forget, Flash keeps a record of all file transfers.

Software Requirements

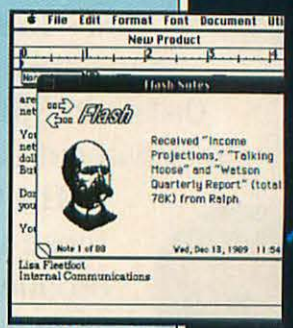
- All Macintoshes on the network must be running System 6.0 or newer.

Hardware You Need

- An AppleTalk compatible network.
- Two or more Macintoshes with a minimum of 1MB of memory.

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- Hard drives not required—Flash works fine on all floppy-based Macintoshes.
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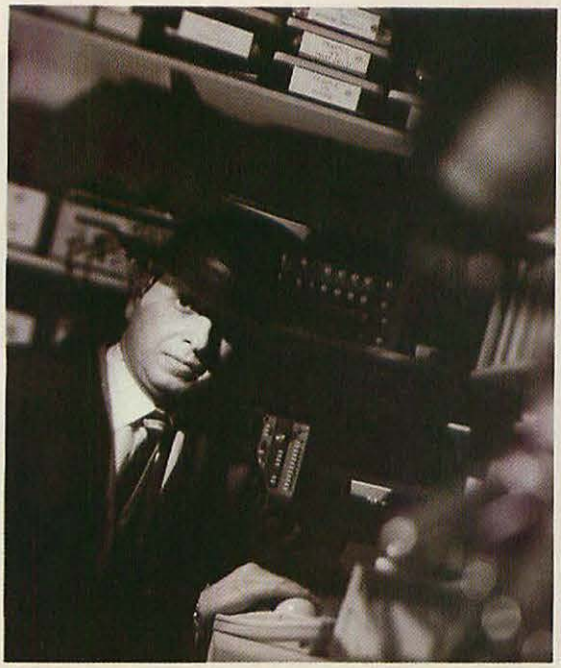
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The Private Eye Mac

You might think that professional musicians would be the biggest users of Digidesign's Sound Tools recording system for the Mac. But Sound Tools is being put to use in a strikingly different area: forensic audio. Anthony Pellicano, of Forensic Audio Lab in Los Angeles, uses the Mac as an electronic detective to analyze and enhance tape recordings that may be used as evidence in court. Besides determining a tape's authenticity and integrity, Pellicano often must enhance a tape by removing noise, or by bringing out, eliminating, or identifying a particular voice or sound—for example, a gunshot.



MAX AGUILERA-HELLWEG

Anthony Pellicano with the sound-analysis equipment he uses to crack crimes and break lawsuits.

Several cases he's working on now involve music: lawsuits filed against rock artists Judas Priest and Ozzy Osborne by the families of people who have committed suicide after listening to their recordings. Pellicano analyzed the records for subliminal messages, back-masking (recording verses backwards), and reverse recording.

"Sound Tools is revolutionizing the whole field of forensic audio," says Pellicano. "You can redact out the samples you want, store them on disc, walk into court, and play them back." The jury can hear evidence from police tapes with dead spaces removed, resulting in what he calls an "audio movie." He adds that Sound Tools also excels at recording and analyzing data from wire-taps and surveillance devices.

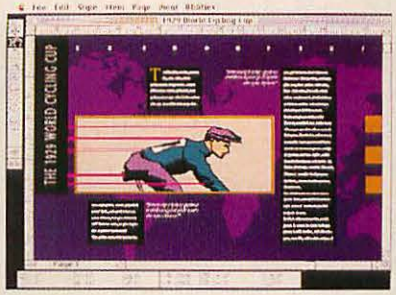
Digidesign has a new, less expensive product, Audiomedia (see *Reviews* in this issue), which uses the Motorola 56001 digital signal processor to write and play back sound directly to and from a hard disk. Though it cannot synchronize sounds to external video and film devices, as Sound Tools can, Audiomedia comes with software for editing sounds and moving them into HyperCard and MacroMind Director files.

Sound Tools retails for $3285 with the Sound Accelerator board, the AD IN analog-to-digital converter, and Sound Designer II editing software; an optional bidirectional interface to a digital tape drive costs $995. The Audiomedia board and software retail for $995. For more information, contact Digidesign in Menlo Park, California, at 415/327-8811.—**Cathy E. Abes**

QuarkXPress Gets the Message

Perhaps hoping to seduce the PageMaker faithful, Quark has code-named the next version of QuarkXPress Eve and given it a much friendlier interface. Version 3.0 has a free-form pasteboard metaphor like Aldus PageMaker and Letraset's new DesignStudio—although the rigid, precise parent-child box structure of earlier versions is still available for those who want it. Another major change is that you can now select multiple objects by shift-clicking or with a marquee, group them, and then edit group members without ungrouping.

The new version adds a library for



QuarkXPress 3.0 offers new tools as well as a palette for setting most attributes of text and graphic elements.

storing commonly used text and graphics, which you can label and then select by category—for example, all borders, or all company logos. A Page Layout window shows all the pages in thumbnail size, where you can change their order or change their default layouts (a document can have up to 127 default layouts). Page numbers readjust automatically, and whole pages can be dragged from one document to another, bringing their default layouts and style sheets with them.

QuarkXPress 3.0's tools are housed in a floating, closable palette. It has some new tools: a free-rotate tool that works on any object, including text boxes (you can edit and even kern rotated text); an intelligent magnifying glass that zooms from 25 percent to 400 percent; and a polygon picture box for wrapping irregular text precisely outside objects or inside shapes. Another floating palette lets you set most text, layout, and graphics attributes, avoiding dialog boxes and hierarchical menus.

Version 3.0's typographical controls provide better widow and orphan management, a special drop-cap command, control over the baseline of the first line in a text block, 720-point type, and for the perfectionists among us, kerning to 1/65,000 inch. The new version also supports 48-by-48-inch pages, horizontal bleeds, and color trapping for registration control.

QuarkXPress 3.0's list price remains $795; upgrade pricing had not been decided at press time. An $8 demo version is also available. For more information, contact Quark in Denver, Colorado, at 303/934-2211. —**D.L.**

(continues)



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Today's lesson: strike "conventional" from your floppy disk vocabulary. The RD Series from Maxell is ten times more reliable than conventional floppy disks. It delivers twice the durability. Twice the resistance to dust and dirt. The Gold Standard always means maximum safety for your data. With the RD Series it means even more.

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A/UX 2.0 Puts a Mac Face on UNIX Applications

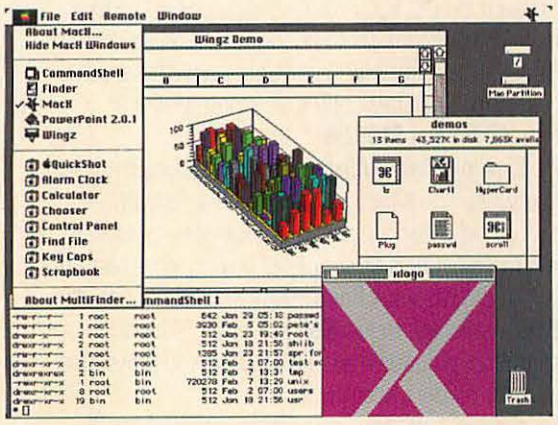
A/UX 2.0, announced as part of Apple's big rollout in mid-March, will make big strides for UNIX by using the Mac desktop to insulate users from UNIX's difficult and obscure command structure. The new operating system version will also enable the Mac to run UNIX and Macintosh applications at the same time.

Although multiple Mac applications will run under MultiFinder with A/UX 2.0, the Mac applications will have to be 32-bit clean because of UNIX's virtual memory scheme. A/UX 2.0 will come with a list of 32-bit-clean applications and will warn you if you try to use an unlisted one. You will be able to add applications to the list.

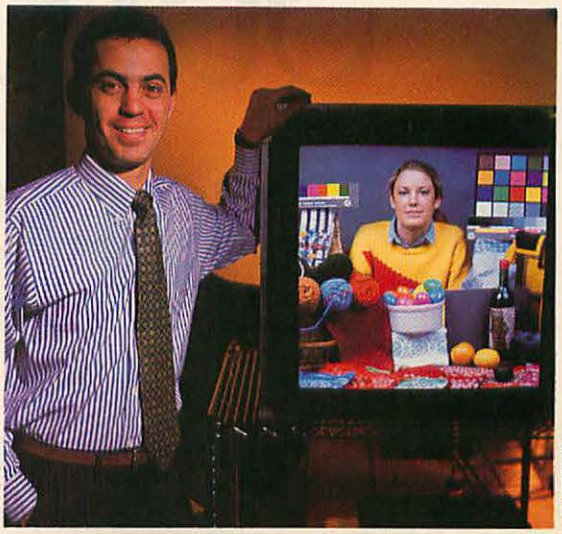
The operating system will simultaneously support multiple UNIX applications and an unlimited number of UNIX scripts, but it will not offer true multitasking. X Windows applications will also run under 2.0. Users will be able to cut and paste text from all three types of applications. When an appropriate graphics standard is established, users will also be able to cut and paste graphics among all three, according to Apple.

The company expects the first customers for A/UX 2.0 to be the federal government, technical users, and segments of large corporations. The operating system should become part of the enormous U.S. Air Force contract under which as many as 80,000 Macintoshes may be bought in the next five years. Apple will also offer A/UX 2.0 through retail channels.

Slated to ship sometime in midsummer, A/UX 2.0 will be distributed on compact discs, tapes, and floppy disks, and 80MB hard disks. The price of the software will vary according to the medium chosen, but had not been set at press time. For more information, contact Apple Computer in Cupertino, California, at 408/996-1010.—**T.M.**



This A/UX 2.0 screen shows Wingz, X Windows, and that rascally UNIX.



ANDY FREEBERG

Sergio Canetti graduated from NYU's Interactive Telecommunications program and joined Nynex.

The New Media Masters

"As the microchip gets smaller and more powerful, as video moves inexorably toward digital format, and as fiber optics develop, media is changing rapidly. Video and computing are converging and traditional businesses are collapsing together." So says Red Burns, who chairs New York University's Interactive Telecommunications Program, where a new class of multimedia design professionals are in training.

The department is part of NYU's Tisch School of the Arts, and its students enter with backgrounds ranging from computer science to fine arts to journalism. The two-year master's program includes classes in marketing, history, aesthetics, communications theory and ethics of new communication forms, and hands-on practice in a lab stocked with audio and video tools, 14 Macs, 7 Amigas, and 5 IBM PCs.

What does a person do with a degree in Interactive Telecommunications? At the Nynex Science and Technology Media Laboratory in White Plains, New York, Sergio Canetti is exploring how we'll use video, audio, and high-resolution images in our telephone conversations when the phone companies have laid fiber-optic cable. ITP graduate Paula Lawley designed two laser discs about the history of space exploration: one on the Voyager explorations, another on the planet scapes of Earth, Venus, Mercury, and Mars. Lawley works for the largest publisher of educational laser discs, Optical Data, in Warren, New Jersey, which also publishes the news-footage laser discs created by ABC News Interactive—another employer of ITP alumni. In San Francisco, ITP graduate Nick West founded his own multimedia production company, The Media Team, after a stint at Apple's Multimedia Lab. More ITP alumni work at CBS, Turner Broadcasting, HBO, the *New York Times,* Citibank, Chemical Bank, MCI, AT&T, and ITT.

"It is difficult to see where [the technology] will lead," says Burns. "The best we can do is to give students a firm grounding in aesthetics, ethics, and the fundamentals of the technology. Instead of exalting technology itself, we emphasize human questions: What do we want to say? How do we say it? Why are we saying it?"

For more information, contact NYU's Interactive Telecommunications Program at 212/998-1880.

—Ann Garrison

(continues)

Sure beats sneakers.



One of the oldest file transfer methods known to Mac is about to become obsolete. You can now forget about using your "sneaker network" to run disks and files between computers around the office.

Introducing LapLink Mac III, the fastest, easiest way to transfer files between Macs or between a Mac and a PC.

LapLink Mac III is very versatile and lets you move files at speeds of nearly 3 megabytes per minute.

That's fast. And it's also easy, thanks to a simple interface familiar to anyone who uses a Mac. Just select the files you want to transfer and click on the copy button.

The new LapLink Mac III comes in two versions. The ***Connectivity Pac*** gives you everything you need to transfer files between two Macs or a Mac and a PC. You get a universal cable that connects a Mac to a PC or to another Mac. An accelerator that boosts Mac-to-Mac file transfer speeds to up to 750,000 baud. File translators that make it simple to convert word processing documents from Mac formats to PC formats—or vice versa. And the ability to transfer files between two users over your existing AppleTalk cables or remotely over a modem. All for just **$189.95***.

The LapLink Mac III ***Network Pac*** lets you transfer files between five Macs on an AppleTalk network—without a dedicated file server or expensive hardware. Adding more users is as simple as buying more Network Pacs. And the Network Pac's suggested retail price of **$299.95*** works out to just **$60 per user**. Not bad for a package that includes three-level password protection and remote modem access.

For more information, including a LapLink Mac III brochure, call us at **(800) 662-2652**, extension **202**.

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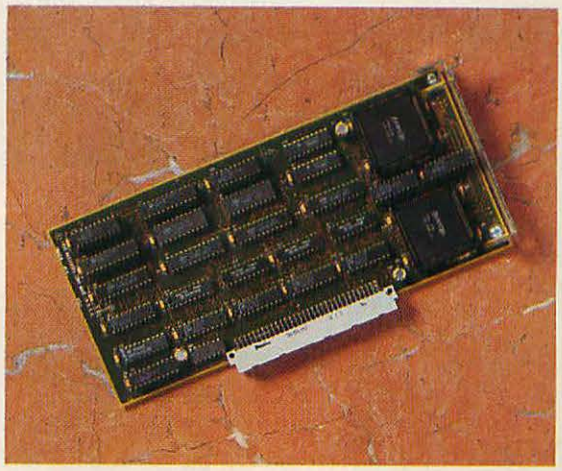
Circle 304 on reader service card.

Survey: Our Readers Approve the IIci

Our survey this month takes stock of readers' plans to buy various Macintosh models in the next 12 months. Among all respondents, 10.8 percent said they will buy a Mac Plus, 19.2 percent chose the SE, an impressive 28.2 percent opted for the SE/30, only 3.3 percent said they would select the moribund Mac II, and 4.4 percent said they would purchase a Mac IIx. The largest vote, 29.5 percent, went to the Mac IIcx. As for Apple's newer machines, 24.4 percent of our readers said they would buy a IIci, while the Mac Portable garnered the endorsement of 14.4 percent. 26.2 percent of all responding readers said they had no plans to buy a Mac in the next 12 months. (Where figures do not add up to 100 percent, readers either responded with "Don't know" or gave no answer to a specific question.)

Of those readers who said they would buy at least one IIci, 41.5 percent rated the power of its 25MHz 68030 as excellent and 20.5 percent considered its power to be good. As is often the case with Macs, readers were less impressed with the IIci's price. Only 0.5 percent of future purchasers found the price excellent, while 14.4 percent called it good, 28.7 percent considered it only fair, and 21.5 percent rated the price as poor.

The attributes of the Mac Portable that fared best were battery life span and portability, with 24.9 percent of its intended buyers saying that the length of its battery life is excellent and 22.3 percent rating battery life as good. 10.5 percent called its portability excellent, and 21.5 percent rated portability as good. However, despite their intent to purchase at least one Mac Portable in the next 12 months, these readers were very unhappy with the Portable's weighty price tag. A mere 0.3 percent found its price to be excellent, 5.1 percent called it good, 22.6 rated it fair, and 34.1 percent judged its price to be a poor feature. —**T. M.**



PIERRE-YVES GOAVEC

The Imager accelerates CAD/CAM and other applications on the Mac II series.

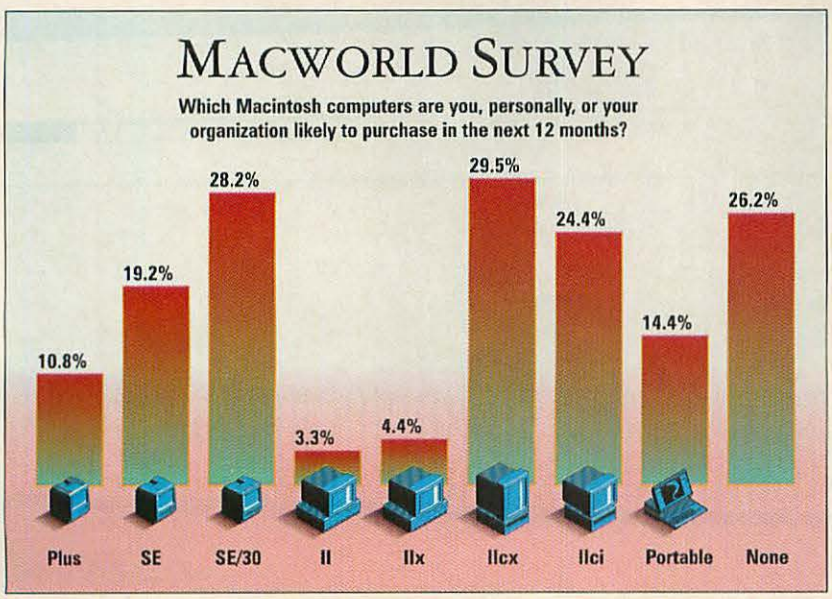
RasterOps Introduces the Imager Accelerator

RasterOps will unveil at Macworld Expo in April a QuickDraw accelerator designed to speed up CAD/CAM and other Mac applications as much as ten times. Called The Imager, the NuBus board will implement QuickDraw calls not accelerated by other boards, including Off-Screen Copy Bits. The device is the first QuickDraw accelerator that speeds up applications such as PageMaker, which runs more than twice as fast with The Imager, according to RasterOps. The Imager accelerates virtually all imaging instructions, but does not improve the drawing of lines or of ordinary text.

The board has bus master capabilities so it can take advantage of the NuBus block-transfer mode, which runs at up to 40MB per second. Scrolling and fills operate about ten times faster with The Imager. The board uses two custom chips and a pixel cache with very fast static RAM to achieve its speed.

Although The Imager will speed up a variety of display boards designed by RasterOps, it will not be certified to work with other vendors' products. According to RasterOps, The Imager can run with up to five video boards installed in the Macintosh and accelerate them all at the same time. The new board is compatible with the IIci's caching system, and will be compatible with System 7.0 when it comes out.

The Imager is slated to ship beginning at the Expo in April. Its price had not been finalized at press time, but RasterOps says it will probably be between $595 and $795. For more information, contact RasterOps in Santa Clara, California, at 408/562-4200.
—**T.M.**



Macworld readers who responded to our survey said they are most likely to buy the IIcx, the SE/30, and the IIci in the next year.


Macintosh IIfx

POWER AT A PRICE

The new Macintosh IIfx: Apple Computer unveils the swiftest and costliest Mac yet

While the world waits for a low-cost Mac that's faster than a Plus or SE, Apple continues to aim its engineering prowess at the high end of the market. The latest member of an increasingly elitist product line is the Macintosh IIfx, an engineering tour de force that combines a fast clock rate, an exotic memory design, and specialized coprocessors to leave every other Mac in the dust. The IIfx almost deserves the name Macintosh III—it's as technologically superior to the rest of the Mac line as the Mac II was to its predecessors.

The new machine is also a bellwether. According to Apple, some of the IIfx's technology will eventually surface in other Mac models. Perhaps one of them won't require four-year financing: the IIfx is expected to cost between $10,000 and $12,000 (final prices weren't available at press time).

The IIfx's performance and price send some messages about the Mac's future and the markets Apple wants to serve. The IIfx also raises questions about the viability of the Mac IIci, which is much slower, but not much cheaper. What's more, some of the IIfx's technology isn't fully exploited by the Mac's current system software, or even by the forthcoming System 7.0.

BY JIM HEID

PHOTOGRAPHS BY STAN MUSILEK

Apple has created a machine for the future—but hopes you'll buy it now.

We'll address those issues, but first, let's kick the tires and pop the hood. What follows is based on a day-long press briefing with Apple product managers and engineers. Apple also showed three new video boards (see "Apple's New Video Boards") and version 2.0 of A/UX, Apple's version of the UNIX operating system (see *Macworld News,* in this issue).

It's No Subcompact

The IIfx's looks belie its nimble performance. The machine uses the bulky Mac IIx case, whose side-panel ventilation slots prohibit it from sitting vertically on the floor unless you use special brackets such as Kensington's Macintosh II Stand. The smaller Mac IIcx and IIci are designed to operate vertically or horizontally.

Balancing performance is more effective than just boosting the clock speed of the CPU

Like the II and IIx, the IIfx accommodates up to two SuperDrives and one half-height, 5¼-inch hard disk. (The IIfx will be available with no hard disk, with one 80-megabyte hard disk, or with one 160MB hard disk.) On the back of the case are two serial ports, two Apple Desktop Bus (ADB) ports, a SCSI connector, and a stereo sound jack.

The family resemblance continues inside the case. The IIfx uses the same, 230-watt power supply as the IIx, but a larger, variable-speed fan cools things more quietly. The internal floppy and hard disk drives mount on the same bracket that holds them in a IIx. That means some extra effort for service technicians, who must unscrew the bracket and remove the drives to fully access the machine's main logic board.

Chairman of the Boards

The IIfx's logic board is the same size as the IIx's, but thanks to seven new Apple-designed chips, the board contains fewer components (see "Logic Board"). For all its extra punch, the IIfx has about the same number of chips as the IIci.

Presiding over this snazzy silicon is a 68030 CPU running at a sizzling 40MHz clock rate—500 percent faster than the SE's clock rate, and 60 percent faster than the IIci's. As in the IIci, the IIfx implements the 68030's burst mode, allowing the Mac's Toolbox routines to transfer large blocks of data quickly. The 68882 floating-point math coprocessor also runs at 40MHz.

40MHz isn't the fastest clock rate in the Mac world; some Mac II accelerator boards use a 50MHz metronome (see "Pushing the Mac II Performance Envelope," *Macworld,* February 1990). But thanks to some performance-tuning techniques we'll examine shortly, the IIfx still outruns a Mac equipped with a 50MHz accelerator (see "Speed Tests: IIfx at a Blur"). Apple's engineers have demonstrated once again that balancing performance across a machine's architecture yields a more significant improvement than just boosting the clock speed of the central processor.

The IIfx logic board contains six NuBus slots, clocked at the same 10MHz NuBus rate used by other Mac IIs. Some hardware manufacturers might be disappointed that Apple didn't boost the NuBus's clock rate; the 10MHz rate can be a bottleneck for boards that work with vast amounts of data, such as digital signal processors and 24-bit video boards. Apple says a faster NuBus will have to wait until after the NuBus standards committee releases its NuBus 90 specification, which allows for a 20MHz clock rate.

To accommodate performance-intensive expansion boards, the IIfx provides a 120-pin Processor Direct Slot (PDS) that provides direct access to the CPU bus and is clocked at 20MHz (see "What Makes the IIfx Run So Fast?"). The IIfx's PDS includes the same features as the SE/30, plus more; the primary difference is that the IIfx's slot is connected in line with the NuBus slots and is supported by the IIfx's Slot Manager. When you plug a board into the PDS, the IIfx's ROM maps the PDS board into what was previously NuBus address space. Thus, a PDS board designed for the IIfx can, like a NuBus board, be self-configuring: it can have a declaration ROM that contains information about the board, as well as driver software that the Mac's Slot Manager can load during start-up. As for existing PDS boards, Apple says many should work in the IIfx, provided they fit within the case. Boards designed for the IIfx's PDS can be as big as NuBus boards—roughly 4 by 12 inches.

In the Mac IIci, the PDS can accommodate an optional cache memory board, which boosts performance by providing a small amount (usually 32K) of fast static RAM that holds data likely to be required by the CPU. In the IIfx, the logic board contains a 32K static RAM cache that is fine-tuned to work with the IIfx's sophisticated memory subsystem.

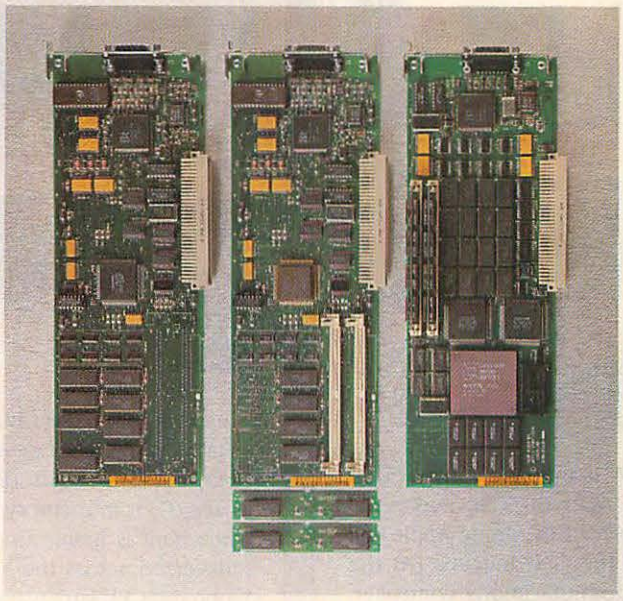
Extra Memory Lanes

Like the IIci, the IIfx requires dynamic RAM (DRAM) chips with an 80-nanosecond access time, mounted on Single Inline Memory Modules (SIMMs). A parity memory option is also available. There, the similarities end. The IIfx's minimum memory configuration is 4MB, expandable in one leap to 8MB; other Macintoshes include just 1MB of RAM, which you can expand in smaller increments. As 4-megabit and 16-megabit DRAM chips become available, the IIfx main

APPLE'S NEW VIDEO BOARDS

The IIfx is the hot new star of the Macintosh line, but Apple's three new video boards—the Macintosh Display Card 4•8, the Macintosh Display Card 8•24, and the Macintosh Display Card 8•24 GC—may have a larger impact on the Mac world. For one thing, they work on all members of the Mac II family. For another, they represent Apple's push toward 24-bit color as a standard, not a luxury. And with their video equipment compatibility, these boards will help the Mac make further inroads into the television world.

The 4•8, 8•24, and GC boards replace all other Apple video boards, except for the $199 monochrome video board. The new boards sense which Apple monitor you're using and configure themselves automatically. Apple says the boards should work with multiscanning monitors such as Sony's Multiscan when used with a cable designed for the video boards.



STAN MUSILEK

Three new Macintosh Display Cards: 4•8, 8•24, and 8•24 GC

For television applications, all three new boards support NTSC video output, although the 4•8 and 8•24 will need a special cable that merges the red, green, and blue signals into a composite video signal. To improve image quality and eliminate flicker, all three boards use a patented technique called Apple Convolution, in which each scan line is evaluated and averaged with lines adjacent to it. Because of the extra memory required for the convolution algorithm, the GC and the 8•24 support only 256 colors when outputting interlaced video.

The 4•8 board displays up to 256 colors on Apple's color monitors and up to 16 gray levels on Apple's monochrome monitors. The 8•24 supports up to 256 gray levels on Apple's monochrome monitors, and up to 16.7 million colors on Apple's color monitors. Prices weren't available at press time, but the 4•8 is expected to sell roughly for $700 and the 4•8, for around $1000. An upgrade from the 4•8 to the 8•24 board will cost about $300.

The GC board provides 24-bit color with a twist: speed. Thanks to the GC's dedicated graphics processor (an American Micro Devices 29000 running at 30MHz), true-color images snap into view instead of oozing onto the screen. Scrolling a 24-bit image with the GC is faster than scrolling an 8-bit image with Apple's original Macintosh II High-Resolution Display Video Card (see "Speed Tests: IIfx at a Blur").

Thanks to its support of NuBus block transfers in both master and slave modes, the Macintosh Display Card GC will also boost the performance of the 4•8 and the 8•24 video boards. (The 4•8 and 8•24 boards support block transfers in slave mode only.) Apple says the GC will also improve the performance of other video boards you may have installed, especially if the boards support NuBus block transfers.

A 2MB video RAM (VRAM) upgrade will be available for the GC, which will boost its total VRAM to 4MB. The extra VRAM can be used by applications that create off-screen bitmaps (most graphics-intensive programs do). Apple says programs that use standard 32-bit QuickDraw routines will automatically take advantage of the extra 2MB when it's installed.

The GC board provides general-purpose graphics acceleration. It won't cut the time required to render a complex, ray-traced image, although it will display the final product faster. Nor is the GC optimized for vector (object-oriented) drawing. If the only color application you use is a CAD program such as AutoCAD, you might be better served by a product such as RasterOps' QuickCAD board. Apple is betting—and probably correctly—that most people will be more interested in a graphics accelerator that provides faster performance for all applications instead of just one.

The Macintosh Display Card GC generalist approach is similar to that of SuperMac's Spectrum/24 Series III, although Apple says the GC accelerates QuickDraw more extensively.

It's important to note that none of the new boards provide 24-bit color output for 19-inch monitors. For that, you'll still need to turn to third-party video hardware. And while it's commendable that Apple provides an upgrade path from 8-bit to 24-bit color, it's unfortunate that there's no upgrade from the 8•24 to the GC. These drawbacks aside, Apple's new video boards are winners. And they put new price and performance pressures on third-party video vendors, who up to now have had the true-color marketplace all to themselves.

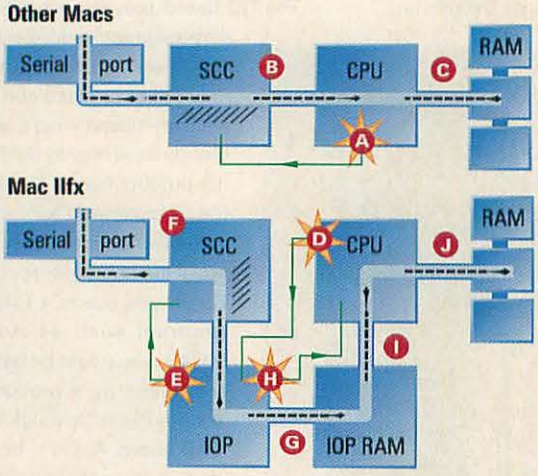
WHAT MAKES THE IIFX RUN SO FAST?

SEVEN KEY PERFORMANCE IMPROVEMENTS

Many components work together to make the Mac IIfx the fastest Mac yet. Here are the seven most important speed tricks employed by the IIfx. Each relates to components on the IIfx's digital board.



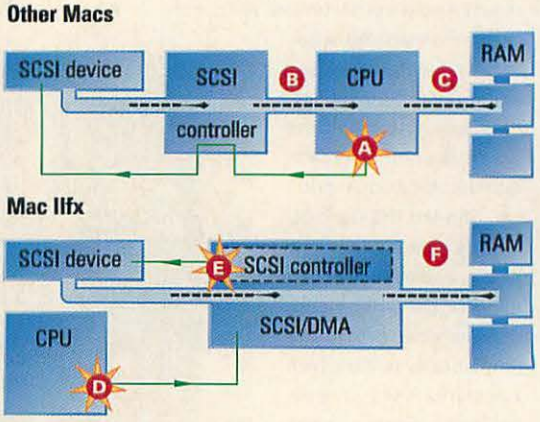
1 I/O PROCESSORS



In other Macs, the CPU is intimately involved in accessing floppy disks, ADB devices, and serial devices. For example, to read incoming AppleTalk data from a serial port, the CPU initiates (A) the receipt via the serial communications controller. The SCC repackages (B) the data for the CPU, which stores (C) the data in RAM. Due to AppleTalk's timing requirements, the CPU must shut itself off for 20 milliseconds for each packet.

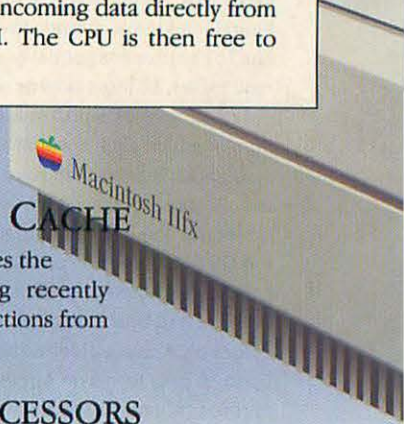
In the IIfx, the CPU directs (D) the serial IOP to initiate (E) the receipt of AppleTalk data via the SCC. The SCC repackages the data (F) for the IOP. The IOP stores the data (G) in its own 32K memory buffer and notifies (H) the CPU that data is waiting in the buffer. When the CPU is ready, it retrieves the data (I) from the IOP's buffer and stores it in RAM (J). This frees the CPU to perform other tasks.

2 SCSI/DMA



In other Macs, the CPU establishes (A) communications with a SCSI device via the SCSI controller. Next, the CPU reads (B) the incoming data and stores (C) it in memory. The CPU often must wait while data is being accessed on a hard disk and transferred across the SCSI bus to the controller. When the CPU isn't waiting, it's actively involved in the data transfer, making sure each byte arrives at its destination.

In the IIfx, the CPU instructs (D) the SCSI/DMA to establish communications (E) with the SCSI device and to transfer (F) the incoming data directly from the SCSI bus into RAM. The CPU is then free to move on to other tasks.



5 FAST BUS, SLOW BUS

Slower components use a slow bus, while quick components use a faster bus. Specialized buffers transfer information between the two buses.

6 STATIC RAM CACHE

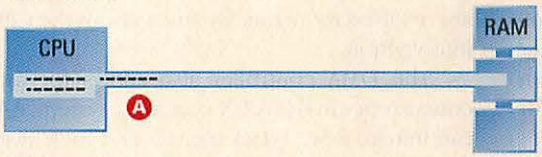
A fast new cache saves the CPU from retrieving recently used data and instructions from slower RAM chips.

7 FASTER PROCESSORS

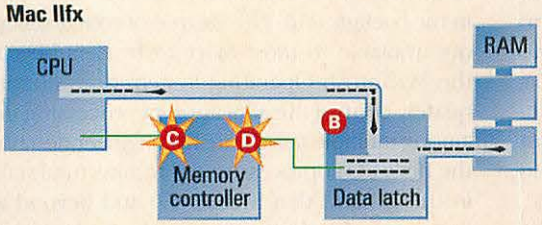
Both the 68030 CPU and the 68882 FPU now operate at 40MHz—a much faster clock rate than previous Macs.

3 Data Latches

Other Macs



Mac IIfx

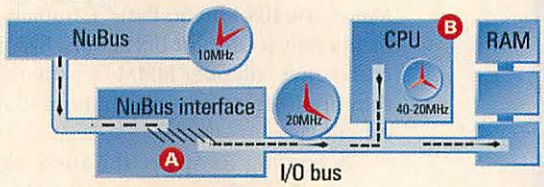


In other Macs, RAM operates at a slower speed than the CPU. To overcome this incompatibility, the CPU sends information (A) only when RAM is ready to receive it. The process of sending data (which includes waiting to send data) prevents the CPU from doing any other work: reading data from the static RAM cache, I/O bus, or ROM.

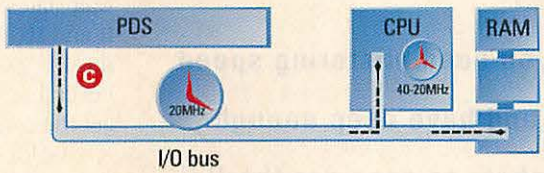
In the IIfx, when the CPU writes to RAM, the data is intercepted (B) by a high-speed data latch. The memory controller immediately tells (C) the CPU that the write is completed, thus freeing the CPU to move on to other tasks. The memory controller synchronizes (D) the transfer of data from the latches to RAM.

4 Processor Direct Slot

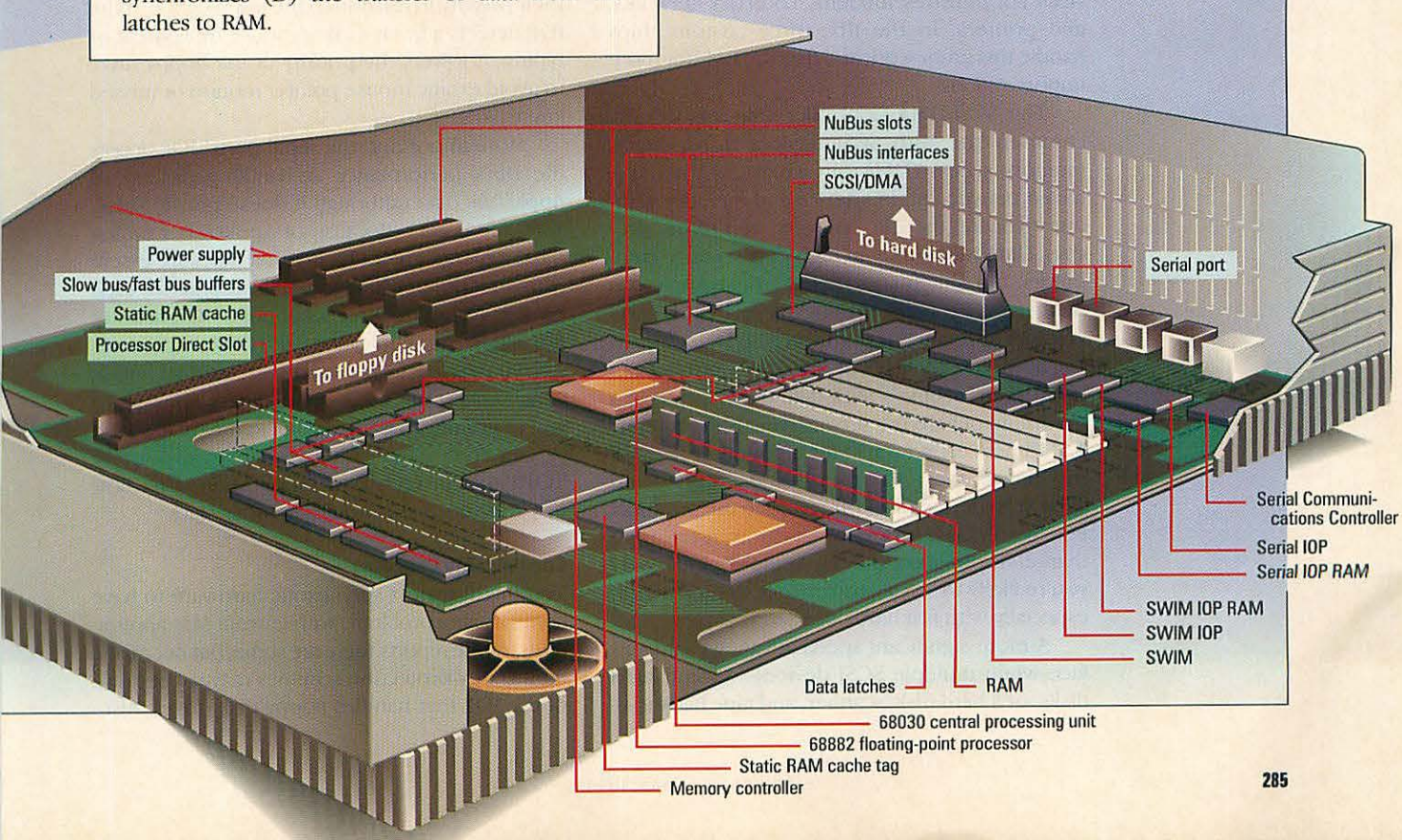
NuBus slot



Processor Direct Slot



Data transfers directly between NuBus boards and the CPU or RAM must undergo a timing resynchronization process (A) from 10MHz to the 20MHz rate of the I/O bus. (The CPU slows down (B) to accommodate the 20MHz clock rate of the I/O bus.) This process results in a delay that limits the speed of the data transfer, especially with random-access data transfers such as those used by video boards. The IIfx's Processor Direct Slot operates (C) on the 20MHz input/output bus, so it doesn't require a timing conversion.



logic board will be able to hold up to 32MB and 128MB, respectively.

The SIMMs themselves are different, too. They contain separate input and output lines, which work together with the IIfx's custom memory controller chip to allow data to be written to and read from memory simultaneously (see "What Makes the IIfx Run So Fast?"). Initially, Apple will be the only source for IIfx SIMMs. Eventually other companies will offer SIMMs for the machine, but they are likely to cost much more than those for other Macs.

According to Apple, the IIfx's memory subsystem allows 96 percent of all RAM accesses to occur with no wait states, as opposed to the two wait states in the Mac II and IIx. In English: the IIfx's CPU almost never has to wait to get the data it needs.

If you need blistering speed and have deep enough pockets to consider the IIci, choose the IIfx instead

As for ROM, the IIfx contains 512K of it, mounted on a SIMM. The IIfx's ROM chips are similar to the IIci's. They contain Apple's 32-bit QuickDraw software, and they're "32-bit clean": they follow Apple's latest memory-management guidelines and will be able to access up to 4 gigabytes of memory under System 7.0.

Lightening the CPU's Load

In most Macs, the CPU handles low-level input/output (I/O) tasks such as accessing SCSI devices, floppy drives, modems, LocalTalk networks, and printers. In the IIfx, three custom chips handle this grunt work and free the CPU for more important jobs.

The SCSI/DMA Controller chip lets the IIfx communicate with SCSI devices using direct-memory access (DMA), in which data is transferred between an I/O device and memory without involving the CPU in every step of the process. DMA is common in high-performance computers, but this marks the first time Apple has built it into a Mac, although a few third-party vendors have offered products with DMA.

In theory, the IIfx's SCSI/DMA Controller can boost the machine's SCSI data-transfer rate to a maximum of 3MB per second, versus the roughly 1.5MB-per-second transfer rate of other Mac IIs. In practice, the actual transfer rate depends on what SCSI devices are connected to the machine. Few hard disks, for example, can transfer more than 2MB per second. Still, Apple engineers say you're likely to see a performance improvement, especially with fast hard disks.

A more significant speed advantage can surface when multiple SCSI devices—several hard disks, or a hard disk, scanner, and tape backup—are connected to the bus. The faster transfer rate allows each device to do its work more quickly, freeing up the bus for other devices to use. Also, the SCSI/DMA chip, not the ROM-based SCSI Manager, handles the SCSI bus arbitration phase (the task of granting access to one device when several are vying for the bus). Thus, bus conflicts are resolved more quickly and without the CPU's intervention.

The DMA controller also allows for more concurrency in the A/UX operating system. A/UX can initiate a SCSI data transfer and then switch to a different task while the transfer takes place in the background. This degree of concurrency is not available to most Macintosh users because the Macintosh Operating System does not adequately control the allocation of processing time among multiple tasks. One IIfx engineer described the IIfx's I/O coprocessors as "architectural stakes in the ground that System 7.0 and beyond are cognizant of and are going to take further advantage of."

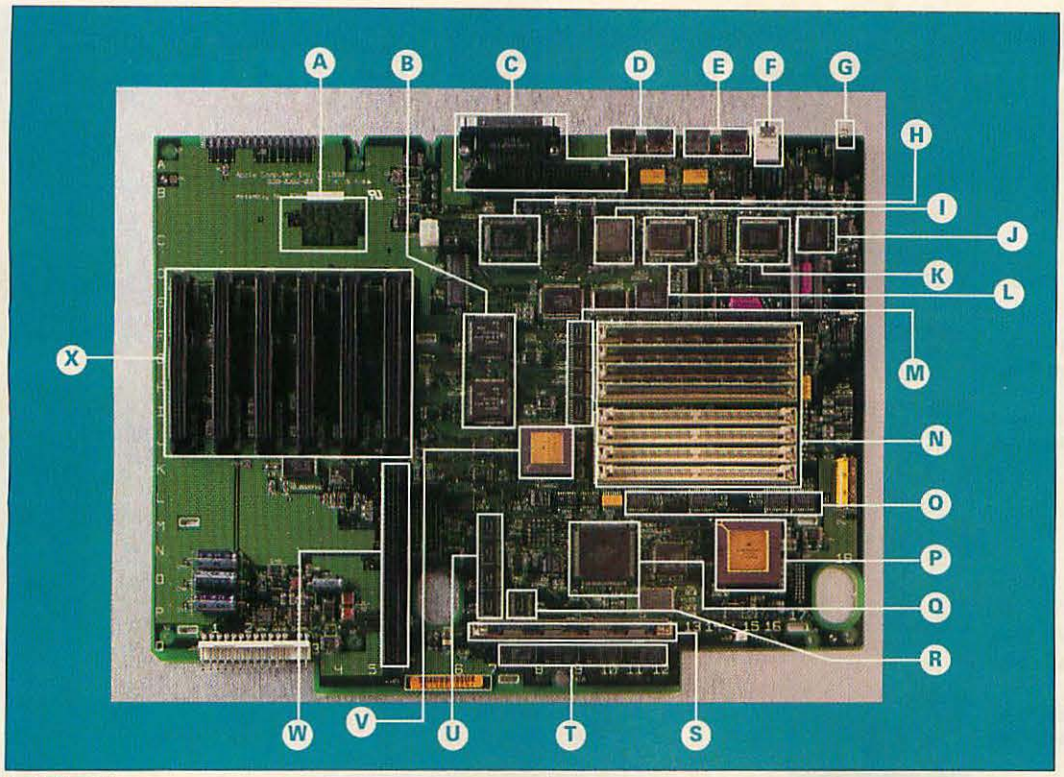
The serial ports and floppy drives use their own I/O coprocessors, called I/O Processors (IOPs). In the IIfx, one IOP handles the modem and printer ports and another controls the floppy drives and ADB ports. The IIfx's product manager described each IOP as an Apple IIe on a chip. Each contains the equivalent of a 6502 microprocessor and 32K of static RAM.

The IOPs improve performance in a few ways. The floppy-and-ADB IOP provides track caching for the IIfx's floppy disk drives, making floppies faster. It also monitors the ADB ports and adjusts their priority in relation to the floppy drive. If the IOP detects a great deal of mouse movement or typing, it lowers the priority of the floppy drive to avoid erratic mouse pointer motion or missed keystrokes.

More important, the serial ports' IOP boosts the IIfx's performance at handling packets of AppleTalk data (although it doesn't make LocalTalk any faster). Because of AppleTalk's timing requirements, the CPUs in other Macs are essentially shut off for roughly 20 milliseconds for each packet. In the IIfx, the serial ports' IOP handles AppleTalk communications; the CPU simply reads a waiting packet from the IOP 's static RAM buffer, which takes only about one millisecond. Thus, if you're printing to a LaserWriter in the background or someone is accessing your hard disk using TOPS, the currently active application won't slow down as much as it would on other Macs.

Compatibility Concerns

You might expect such exotic hardware to have compatibility problems with current Mac applications. Apple reports there are some, but not many. Some copy-protection schemes may fail because of the IOP that handles floppy disk drives. Also,



STAN MUSILEK

Logic Board

A Project team's names
B NuBus interfaces
C SCSI connectors
D Serial ports
E ADB ports
F Sound port
G Power switch
H SCSI/DMA
I SWIM
J Serial Communications Controller
K Serial IOP
L SWIM IOP
M Data buffers *
N RAM
O Data latches
P 68030
Q Memory controller
R Signal Control Buffer *
S ROM
T Static RAM cache
U Address buffers *
V 68882
W Processor Direct Slot
X NuBus slots

* = Buffers between fast and slow bus

programs that use the serial ports extensively (such as MIDI sequencers) may not run, since they often directly access the Serial Communications Controller (SCC) chip. Apple has supplied application developers with software routines that allow programs to bypass the IOP and access the SCC directly. Given that MIDI programs are among the few that are copy protected these days, it's a safe bet that most will need minor revisions to run on the IIfx.

As for Apple's software, the IIfx will require System 6.0.5, which contains support for the SCSI/DMA Controller and the IOPs. System 6.0.5 will run on all Macs from the Plus through the IIfx. Finally, a IIfx logic board upgrade will be available for the Mac II and IIx; the price and delivery date were not available at press time.

Can They Build One for You?

There you have it—the fastest, most sophisticated Mac yet. So who needs it? Clearly, it's a natural for tasks that demand fast processing of vast amounts of data, such as video production, 3-D graphics rendering, computer-aided design, animation, 24-bit image processing, and digital audio processing. The IIfx's speed and co-processing capabilities will also appeal to A/UX users. It may find a home in large networks, where it can, Apple says, run Apple's Internet Router software with enough power to spare to serve as a workstation. And speaking of workstations, the IIfx may attract customers who might otherwise buy from Sun Microsystems, Next, or Apollo. (Two of the fx's engineers are Apollo alumni.)

The IIfx costs a bundle, but it delivers. Indeed, it may offer more performance for the money than any other Mac. And the MS-DOS and OS/2 world has nothing that compares—especially when you figure the Mac's elegant system software and huge application software base into the equation.

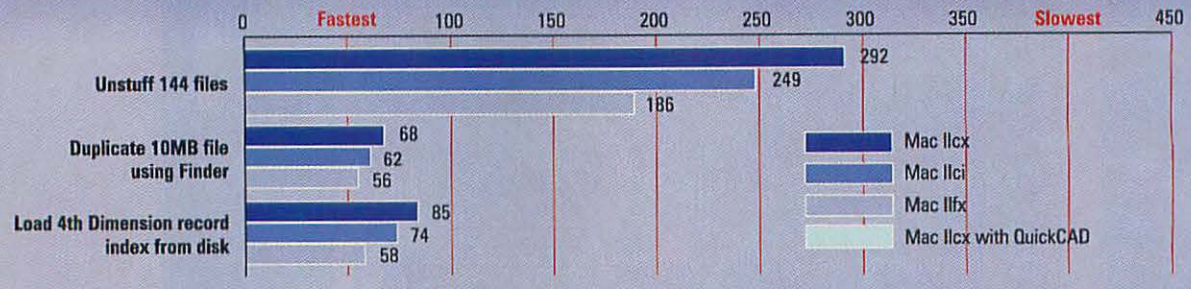
What of the IIci's future? You decide—it's half as fast, but costs only about $3000–$4000 less. People who need blistering speed and have deep enough pockets to consider the IIci should choose the IIfx instead, especially given its forward-looking design.

Finally, what about the rest of us—the market the Mac was first designed for? As I drove home from Apple's briefing, a radio report said

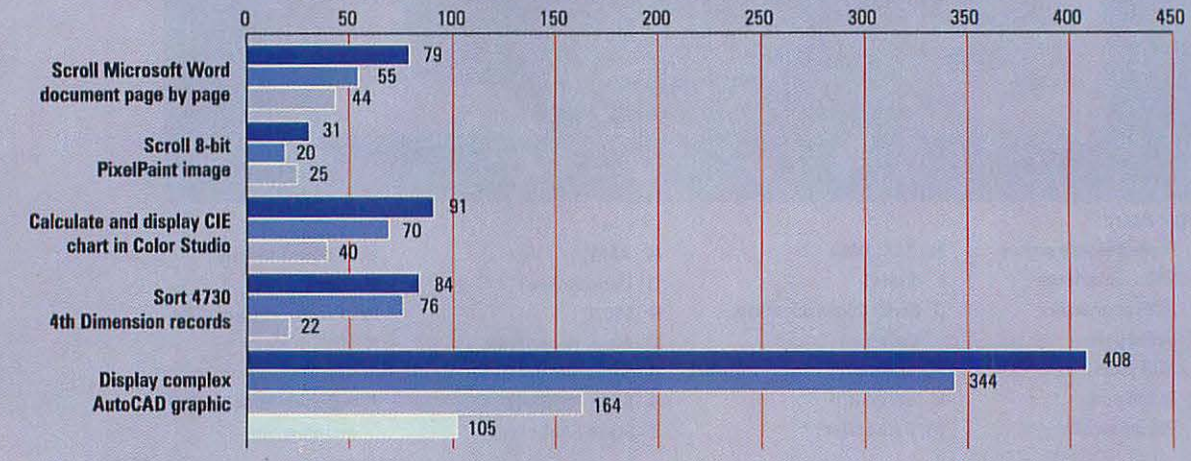
SPEED TESTS: IIFX AT A BLUR

DISK-INTENSIVE TESTS

measured in seconds taken to complete task



PROCESSOR-INTENSIVE TESTS



To test the IIfx's performance, Macworld Labs ran seven benchmark tests on a prototype IIfx, a IIci, and a IIcx, all equipped with 8MB of memory, a fast 100MB hard disk, and 8-bit video hardware configured to display 256 colors. All tests were performed with MultiFinder disabled using a prerelease version of System 6.0.5 and Finder 6.1.4. The machines' RAM caches were set to 128K, and the IIci didn't contain a cache memory board.

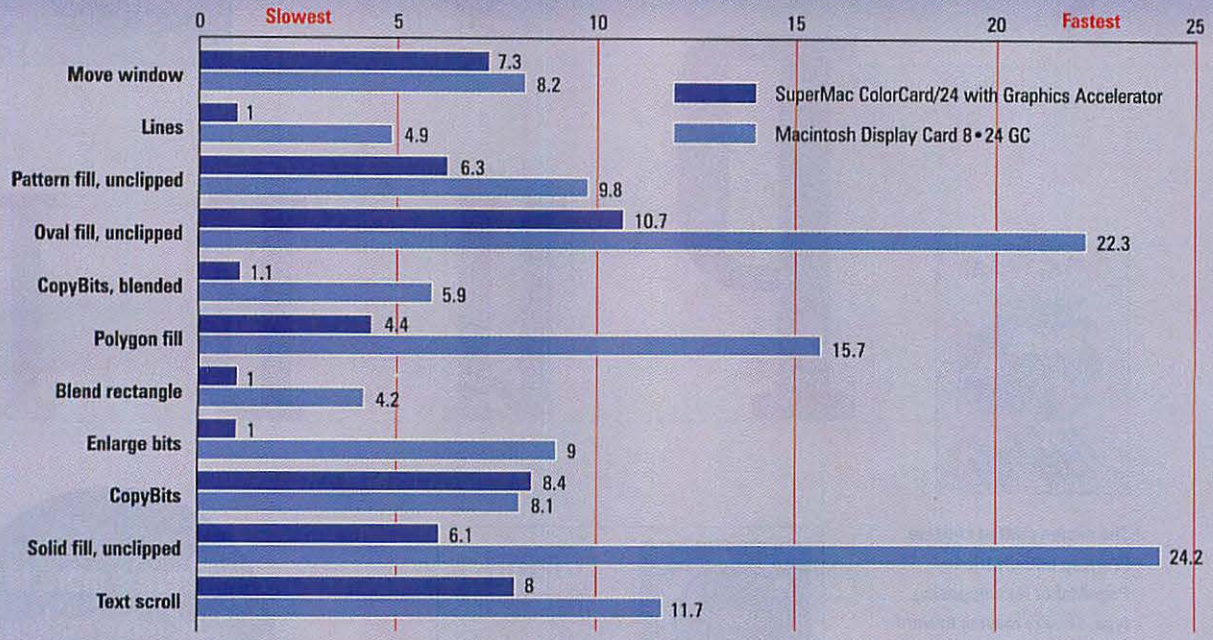
The five processor-intensive tests yielded the most significant speed differences. In more than half of these tests, the IIfx averaged 43 to 71 percent faster than the IIci, and 56 to 73 percent faster than the IIcx. One notable exception: The IIci, with its built-in video circuitry, scrolled an 8-bit PixelPaint image 20 percent faster than the IIfx. This shows that NuBus is a performance bottleneck for video boards. We also ran the AutoCAD test with the Radius QuickCAD board for comparison.

The three disk-intensive tests gauge the performance impact of the IIfx's SCSI/DMA Controller. The IIfx ranged from 10 to 25 percent faster than the IIci, and from 18 to 36 percent faster than the IIcx. This validates Apple's claim that the SCSI/DMA Controller boosts performance with a fast hard disk, even though the Mac's current system software doesn't take full advantage of the new chip's coprocessing capabilities.

Apple had announced some layoffs and cost-cutting measures. One analyst said that the firm's lagging sales were due to a lack of attention to the low end of its product line. It was an ironic end to a day filled with cutting-edge, patent-pending technology.

Apple is pushing technology-intensive applications and hardware—hardware that, in Jean-Louis Gassée's words, "makes developers and users drool." That's commendable, but drool doesn't sell machines or pay shareholder's dividends. Perhaps this point has finally sunk in at Apple. In February, as the call from industry analysts for more affordable machines became a roar, several top executive slots were reshuffled and Gassée himself resigned.

VIDEO BOARD TESTS measured as times faster than stock IIfx



To compare the performance of the Macintosh Display Card 8•24 GC with SuperMac's Spectrum/24 with Graphics Accelerator, we placed both boards in 8-bit (256-color) mode and ran an Apple graphics benchmarking utility called GeeBench, written by Jean-Charles Moray, one of the GC's engineers. We used both boards in a prototype IIfx configured as described above. The values reflect the degree of performance improvement over a IIfx without a graphics accelerator.

The results? In nearly every test, the GC performed significantly faster than the SuperMac board. The one exception was the CopyBits test, in which the SuperMac card did slightly better. (QuickDraw's CopyBits routine is used extensively by graphics software.)

We didn't test the boards' performance using real applications because Apple was still in the process of optimizing the GC's internal software to work better with specific application programs. Thus, the results would not have applied to the final GC product. What's more, it's likely that some application programs will be modified to take full advantage of the GC. Caveats: These benchmarks were run using prerelease system software and prototype hardware. The performance of the final, off-the-shelf products will probably differ somewhat. Take the video board benchmarks with an especially large grain of salt: they represent theoretical performance increases, and ones reported by an Apple-authored utility, at that.

Still, it is safe to draw some conclusions: With processor-intensive tasks, the IIfx is generally at least twice as fast as a IIci, and the GC promises to accelerate QuickDraw to a greater extent than SuperMac's ColorCard/24 with Graphic Accelerator. However, SuperMac may have an improved board by the time this article is published.

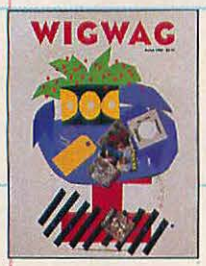
Some have joked that Apple keeps introducing faster machines so that it can revise its own corporate organizational charts more quickly. The truth is, Apple's goal for the past few years has been to get more Macintoshes into corporate America, a strategy that most analysts agree has worked. Now that that's done—and now that Apple has shown its hand at the high end—it's time for it to deliver a faster, more affordable successor to the Plus and SE. M

See *Where to Buy* for contact information.

***Jim Heid**, coauthor of* Inside the Apple Macintosh *(Brady, 1989), is a* Macworld *contributing editor.*

Picking a PuBL





The design staff at start-up *Wigwag* initially tried PageMaker for composing type. They're moving toward QuarkXPress now, however, because of its superior typographic controls.

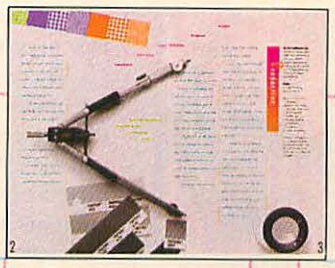


There's more to Mac page makeup these days than the "big three"



Dale Horstman at Clement Mok Designs, San Francisco, used PageMaker to produce this promotional brochure.

Toolbox



Rudy VanderLans, of Berkeley, California, lays out the outré but influential design quarterly *Emigre* using ReadySetGo (left). Designers at Sherwood Associates, Panorama City, California, produced this newsletter in PageMaker.

PROGRAM ISHING

BY STEVE ROTH

Life used to be so easy. A year ago, choosing a page-makeup program for the Mac meant deciding between three programs. The field has always been fast-moving, but back then you could keep up.

These days, it's a maelstrom of new programs, new versions, and on the horizon, promising prospects. What's more, all the current offerings are pretty good in their own way—choosing one is simply a matter of deciding if its way is your way.

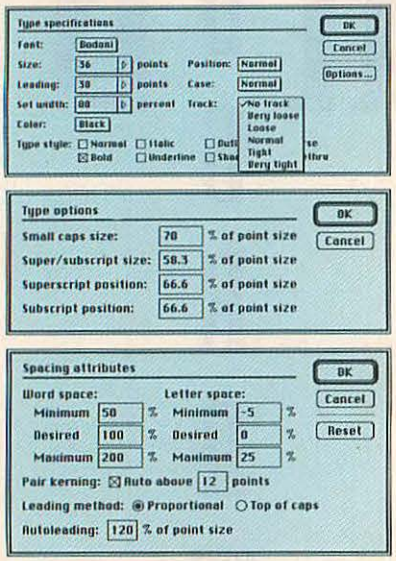
The three big names in page makeup have achieved the status of household—or at least desktop—words: PageMaker, ReadySetGo, and QuarkXPress. In the last year, two of the above programs have produced offspring. ReadySetGo has given rise to a power-packed successor named DesignStudio, and QuarkXPress has spawned a stripped-down scion, QuarkStyle. The completely new players on the field offer a wide variety of prices, from very high to bargain basement. Multi-Ad Creator is a pricey but snazzy tool for single-page publishers who want to try, try again, presenting clients with a variety of designs. Publish-It (don't say that too fast) is a new program from Timeworks that offers a bevy of tools at a midlevel price. And Springboard Publisher II is a strong contender for occasional page makers on a budget.

Products in the works include RagTime 3, which handles live spreadsheets, business graphics, forms, and word processing right on the page; Personal Press, which offers several unique features at a





Photo-filled *Elle Decor* uses black-and-white scans for position only, which helps with the magazine's frequent type wraps. All type is composed in QuarkXPress.



PageMaker Typography
Now that PageMaker 4's spacing attributes operate at the paragraph—rather than the story—level, its typographic controls rival anything on the market.

price competitive with QuarkStyle's; and FrameMaker, a long-document publishing package from the UNIX world (see "What's Coming"). In addition, both Aldus and Quark are readying major new versions of their flagship programs.

Aldus PageMaker 4.0

Even with all the new contenders, a roundup of Macintosh page-makeup programs has to start with Aldus PageMaker. It's the program most widely used, partly because it boasts an interface that users have come to love and competitors have been hard-pressed to equal. With version 4.0, Aldus has addressed many of the program's most often-cited failings.

Several features combine to make PageMaker's interface a favorite with the reach-out-and-touch-it crowd—people who want to play around with designs interactively. You can see text and graphics as you're dragging and sizing them, rather than just the bounding box displayed by most other programs. You can scroll with a grabber hand. You can just place or create page elements without first creating frames to contain them. You can drag objects off a page onto an underlying *pasteboard,* where they're accessible from any page in the publication.

In a way, PageMaker's strength is also its weakness. The program won't suit users who want to type in specs rather than drag things around, and it's short on the object-creation and -manipulation tools long familiar in draw programs. You can't ask PageMaker to move a page element to the right 3 points, for instance, or align page elements automatically, or duplicate an element a specified number of times in a given direction. There's no grouping; rotation is available only for unthreaded (unchained) text blocks, and then only in 90-degree increments; and line weights and shades are limited to the less-than-ample choices on the menu.

While earlier versions had some pretty serious typographic limitations, PageMaker 4.0 addresses these shortcomings admirably. You may end up several dialog boxes deep, but if you want to control type, version 4.0 provides almost every tool you need (see "PageMaker Typography"). The one thing missing is a built-in tracking editor à la QuarkXPress or Design Studio—de rigueur for the truly compulsive typographer. PageMaker's style sheets are among the best on the market, and they work seamlessly with Microsoft Word's—a key advantage in production environments.

There's a whole flock of new long-document features in PageMaker 4.0 that set it apart from the other players and make it more effective as a page-production tool. Automatic table-of-contents and excellent index generation; inline graphics that flow with text, as in most Mac word processors, instead of sitting there like islands in a stream when you make text changes; a Story Editor for word processor–like editing; a top-notch search-and-replace function that includes the ability to find and change text attributes; and a hard-working spelling checker put PageMaker beyond the layout-only region where it's always resided. Registered PageMaker users can upgrade to version 4.0 for $150.

QuarkXPress 2.12 and 3.0

PageMaker's biggest competition these days is Quark's QuarkXPress, and with good reason. It offers many professional features you won't find in PageMaker. It's set up so accomplished users who know what they want can specify those wants in dialog boxes and let the program do the work. In version 3.0, due out soon, Quark has improved the interface immensely. The current interface isn't very touchy-feely; you have to create frames to contain text and graphics, and while you're moving the frames you can't see their contents. You can't drag items off the page onto a pasteboard, so you end up cutting and pasting a lot; there's no easy way to move threaded text blocks between pages; and you can't customize automatic text wraps by using the mouse, as you can in PageMaker. Worst of all, you cannot select multiple items by Shift-clicking.

QuarkXPress's parent-and-child frames contribute to its plan-ahead approach. With these frames within frames, a child moves with its parent, so a graphic and caption always stay together, for instance. You can't move a child outside its parent except by cutting, so you have to have a pretty fair idea where you're headed when you start creating frames.

Power features in QuarkXPress include multicolumn text frames, process-color separation of native ele-

ments and imported color EPS and object PICT images, robust gray-scale manipulation, on-screen rendering of Type 3 (non-Adobe) PostScript typeface outlines, automatic *continued* lines, and excellent typographic controls that PageMaker has only recently managed to equal.

QuarkXPress also lets you use XTensions (add-on tools that appear on the Utilities menu), created by Quark and several third-party developers. Among other things, the $79.95 QuarkXTras package of XTensions checks text for widows, orphans, loose justification, and questionable hyphenation; calibrates gray levels for different printers; displays and prints a list of graphics in a publication; and invokes Adobe halftone screen values. Third-party XTensions cover areas from publication management to imagesetter calibration.

In its current incarnation, QuarkXPress is a power publisher's dream, especially for process-color work, but it's less a design tool than a production tool. Version 3.0, however, will add many PageMaker- and DesignStudio-like features that may make QuarkXPress hard to beat.

Version 3.0 will have Shift-click multiple selection; a pasteboard that lets you drag items off the page; the ability to keep objects visible as you move them; libraries that work like the Scrapbook for often-used items; rotation of text and graphics in 1-degree increments (rotated text remains editable); color trapping controls; automatic drop caps; adjustable polygonal text-wraps, as in PageMaker; and polygonal frames that wrap text and crop graphics. Version 3.0 will also include new capabilities for working on spreads.

ReadySetGo 4.5

If you exclude the no-longer-extant LetraPublisher (née MacPublisher), then it's fair to say that ReadySetGo, from Letraset Graphic Design Software has always been the poor relation in the Mac page-makeup family. It's loaded with features, it's very usable, and it's fully capable of producing top-notch pages, but ReadySetGo does not offer PageMaker's seductive interface or QuarkXPress's power. And ReadySetGo can't compete with the pricing of QuarkStyle or Springboard Publisher II. At $495, ReadySetGo is less expensive than the power players, but not by a great deal (especially if you consider discounted prices). Letraset is planning an upgrade to version 5.0 for the spring of 1990.

DesignStudio

Realizing that ReadySetGo falls into a pretty deep hole between the two big page-makeup guns, Letraset Graphic Design has just released DesignStudio, which looks a lot like ReadySetGo, but with interface improvements that

WHAT'S COMING

As this article goes to press, there are three other page-makeup contenders on the horizon—a low-priced competitor for Springboard Publisher, a business-document publisher, and a full-blown document-publishing program.

Personal Press, due from Silicon Beach at about the time you read this, is entering the field with a price ($299) that will put it head-to-head with QuarkStyle. Aside from the page-makeup basics, Personal Press will offer several new and unique features.

Proxies let you see changes in thumbnail form before you approve them. Workbooks, like scrapbooks that are attached to a document, take the place of a pasteboard, and enable you to easily store page elements. And Posted Notes are just what you'd expect—pop-up note windows.

Personal Press will provide spot-color separations, robust gray-scale image control, and an attribute-sensitive search-and-replace function.

RagTime 3 is the latest incarnation of a product that is a big seller in Europe and has made two ill-fated entries into the U.S. market. Version 1 was marketed by Orange Micro, but for some reason disappeared from the scene. Version 2 was to be marketed by Cricket Software, but it never appeared. Now version 3 is coming, marketed by the creators themselves.

RagTime is more (or perhaps less) than a page-makeup program. It's a $599 business-document processor that includes text-editing tools, strong forms capabilities, basic page-makeup tools, and business graphics built on top of impressive spreadsheet functions (see "Forming Opinions," *Macworld,* February, 1990). You can even use hot-linked values from a spreadsheet frame within text.

All those features add up to a reasonably complex program, with five different menus and toolboxes for working with different types of frames. As you might expect in an integrated program, the features in each area fall short of what you can get in a stand-alone program (the typographics are basic, for instance, and there are only three types of graphs). As a result, RagTime competes more with Microsoft Works than with PageMaker, QuarkStyle, or any dedicated page-makeup program.

RagTime's page-makeup capabilities definitely surpass those in Works (virtually nonexistent), though, so if you want an integrated program with competent page-layout tools, RagTime is a promising contender.

FrameMaker for the Macintosh, like Interleaf Publisher, is a UNIX-based long-document publisher (it's the page-layout program for the Next) that's being ported to the Mac. FrameMaker differs from Interleaf, though, by offering a more familiar interface, sophisticated typography, the ability to create spot-color publications, and support for any printer. The program has both character and paragraph styles, an equation editor, and a familiar drawing toolbox, to name only a few items that make it a best-seller on Sun workstations. At this writing it was due out in May, at an as-yet-undetermined price (see "What about Interleaf?" for a look at another long-document publisher).

PAGE-LAYOUT SOFTWARE

	Multi-Ad Creator 2.0	PageMaker 4.0[1]	QuarkXPress 3.0[1]	DesignStudio 1.0	ReadySetGo 4.5	Publish-It 1.1	QuarkStyle 1.0	Springboard Publisher II 2.0
Company	Multi-Ad Services	Aldus Corporation	Quark	Letraset Graphic Design Software	Letraset Graphic Design Software	Timeworks	Quark	Springboard Software
GENERAL FEATURES								
Price	$995	$795	$795	$795	$495	$495	$295	$199.95
Multipage documents	○	●	●	●	●	●	●	●
Multisection documents	NA	○[2]	●	○	○	○	●	●
Frames (text/graphics)	●/○	○/○	●/●	●/●	●/●	●/●	●/●	●/●
Nonrectangular frames	○	NA	●[3]	●	○	○	○	○
Master pages	NA	●	●	●	●	●	●	○
Adjustable ruler zero point	●	●	●	●	●	◗[4]	●	○
Snap-to rulers	○	●	○	○	○	○	○	○
Adjustable snap-to gravity	●	○	○	●	●	○	○	○
x-and-*y*-coordinate display	●	○	●	●	○	●	○	○
Column-and-row block grid	●	○	●	●	●	●	○	◗
Drag-out ruler guides (front/back)	●/NA	●/●	●/●	●/●	●/●	◗[5]	○/●	○/○
Pasteboard	●	●	○	●	○	○	○	○
Multiple open documents	●	○	●	●	●	●	●	●
Grabber hand for scrolling	●	●	○	●	●	●	○	○
Thumbnails on-screen/editable	NA/NA	○/○	●/●	●/○	●/○	●/●	○/○	●/○
Move pages	NA	○	●	●	●	○	●	○
PAGE-ELEMENT MANIPULATION								
Shift-click multiple selection	●	●	●	●	●	●	○	●
Grouping	●	○	●	●	○	●	○[6]	○
Rotation (text/graphics)	●/●	●/○	●/●	●/●	○/○	●/●	○/○	○/○[7]
Move (by amount/to coordinates)	○/○	○/○	●/●	●/●	●/●	○/●	○/○	○/○
Alignment of elements	●	○	●	●	●	●	○	○
Scale by percentage (text/graphics)	●/●	○/○	○/●	●/●	○/●	○/●	○/●	○/●
Object visible (while moving/while scaling)	○[8]/○[8]	●/●	○/○	●/○	○/○	○/○	○/○	○/○
Step-and-repeat duplication	●	○	●	●	●	○	○	○
TEXT EDITING								
Text-editor window available	○	●	○	○	○	○	○	●
Spelling checker/ thesaurus/ glossary	●/●/○	●/○/○	●/○/○	●/○/●	●/○/●	●/●/○	●/○/○	○/○/○
Search and replace (text/attributes)	●/●	●/●	●/●	●/●	●/○	●/●	●/○	●/○
Index/tables of contents	NA/NA	●/●	○/○	○/○	○/○	○/○	○/○	○/○
TYPE FORMATTING AND LAYOUT								
Nonrectangular text blocks	○	○	○	●	○	●	○	○
Automatic *continued* lines	NA	○	●	○	○	●	●	●[9]
Automatic text wrap (rectangular/irregular)	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
Wrap inside objects	●	○	●	○	○	●	○	○
Multicolumn text frames	○[10]	○	●	○	○	●	●	●
Available increments (type/leading) in pts.	.01/.01	.1/.1	.001/.001	.01/.01	.01/.01	.01/.01	1/.01	1/1
Paragraph spacing (before/after)	○/●	●/●	●/●	○/●	○/●	○/●	●/●	●/●
Condensing and expanding/custom	●/●	●/●	●/●	●/○	●/○	●/●	○/○	○/○
Automatic fraction building	○	○	○	●	○	○	○	○
Automatic kerning	●	●	●	●	●	●	●	○
Manual kerning (pairs/ranges)	●/●	●/●	●/●	●/●	●/●	●/●	○/○	●/●[11]
Automatic tracking/editable tables	○/○	●/○	●/●	●/●	○/○	○/○	○/○	○/○
Adjustable sub- and superscripts	●	●	●	●	●	●	○	○

● = Yes, ○ = No, ◗ = Feature is implemented but lacking in some respect.

[1] *Prerelease software—specifications subject to change.*

[2] *Can create multiple publications linked with Book feature.*

[3] *Elliptical and polygonal frames for graphics only.*

[4] *Must type x/y position.*

[5] *Only one vertical and one horizontal per document.*

[6] *Parent and child frames are grouped.*

[7] *Except selected portions of bitmaps.*

[8] *Except with native graphic objects.*

[9] *Must type message and page number manually.*

[10] *Can split single-column frames into two.*

PAGE-LAYOUT SOFTWARE (continued)

	Multi-Ad Creator 2.0	PageMaker 4.0[1]	QuarkXPress 3.0[1]	DesignStudio 1.0	ReadySetGo 4.5	Publish-It 1.1	QuarkStyle 1.0	Springboard Publisher II 2.0
Company	Multi-Ad Services	Aldus Corporation	Quark	Letraset Graphic Design Software	Letraset Graphic Design Software	Timeworks	Quark	Springboard Software
TYPE FORMATTING AND LAYOUT								
Small caps/adjustable	●/○	●/●	●/●	●/○	●/○	○/○	●/○	○/○
Tab leaders/custom	●/●	●/●	●/●	●/●	●/●	●/○	●/●	●/○
Automatic rules with paragraph	○	●	●	○	○	○	○	○
Vertical alignment/justification	○/○	○/○	●/●	●/●	●/●	●/●	○/○	○/○
Align paragraphs to baseline grid	○	●	◗	○	○	○	○	○
Keep paragraphs on same page	○	●	○	○	○	○	○	○
Hyphenation (on-the-fly/batch)	●/●	●/○	●/○	●/○	●/○	○[12]/●	●/○	○/●
Forced justification	○	●	●	●	○	●	○	○
Hyphenation/justification controls	●/○	●/●	●/●	●/◗	●/◗	○/●	○/○	○/○
IMPORTING								
Formatted MacWrite	●[13]	●	●	●	●	●	●	●[14]
Formatted Word (version 3/4)	●[13]/○	●/●	●/●	●/●	●/○	●/○	●/○	●[14]/○
Word styles	○	●	●	○	○	○	●	○
Converts quotes and dashes	●	●	●	●	●	○[15]	○	○
Adds pages for placed text	NA	●	●	●	○	●	●	●
EPS, PICT, and MacPaint	●	●	●	●	●	●	●	●
TIFF (bilevel/gray-scale/color)	●/●/●	●/●/●	●/●/●	●/●/●	●/●/○	●/○/○	●/●/○	○/○/○
EXPORTING								
Text/tags	○/○	●/●	●/●	●/●	●/●	○/○	●/○	○/○
Formatted MacWrite	○	●	●	○	○	○	●	○
Formatted Word 3/Word styles	○/○	●/●	●/●	○/○	○/○	○/○	●/○	○/○
COLOR								
Specing (RGB/HSB/CMYK)	○/○[16]/●	●/●/●	●/●/●	●/●/●	●/●/●	○[17]/○/○	○/○/○	○/○/○
Pantone palette	○	●	●	●	●	○	○	○
Apply color to bitmaps	●	●	●	○	○	●	○	○
GRAPHICS								
Custom fill percentages/line widths	●/●	○/○	●/●	○/●	○/○	●/○[18]	○/○	○/○
Inline graphics	○	●	●	○	○	○	○	○
Bitmap editing	○	○	○	○	○	●	○	●[19]
Line, box, and oval tools	○	●	●	●	●	●	●	●
Arrowhead lines/modifiable	○/○	○/○	●/○	●/●	○/○	●/○	○/○	○/○
Additional draw tools	●	○	●	●[20]	○	●	○	○
Gray-scale image control	○	●	●	●	●	○	○	○[21]
PRINTING								
Even or odd pages only	NA	●	●	●	○	○	○	○
Thumbnails/set number per page	NA/NA	●/●	●/●	●/●	●/●	●/●	○/○	○/○
Control screen frequency	●	◗[22]	●	●	●	○	○	○
Color separations (spot/process)	●/●	●/○	●/●	●/○	●/○	●/○	○/○	○/○
Facing pages on single sheet	NA	○	●	○	○	●	○	○
Saddle-stitch imposition	NA	○	○	○	○	●	○	○
OTHER								
Controls for external file links	●	●	●	○	○	○	○	○
Render Type 3 PostScript typefaces	○	○	●	○	○	○	○	○
Hooks for menu and feature additions	○	○	●	●	○	○	○	○
Online help	●	●	●	○	○	●	●	●

[11] *In whole-point increments.*

[12] *Only as you type, not while reflowing.*

[13] *Character formatting only.*

[14] *Formatting not imported.*

[15] *Can convert selected text after importing.*

[16] *RGBK specing available.*

[17] *Seven predefined color layers for spot-color work.*

[18] *Wide variety of canned sizes.*

[19] *72 dpi only.*

[20] *Polygon tool.*

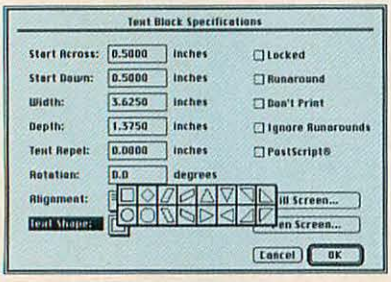
[21] *Can adjust gray percentage for bilevel bitmaps.*

[22] *Except by editing external APD files.*



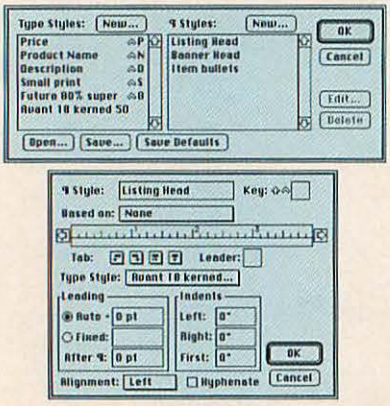


***Entertainment Weekly* is Time-Warner's first desktop venture. The staff produces all type plus some line art and spot color in QuarkXPress. PostScript files are then rasterized using Scitex's VIP, combined with color separations, and output on a film printer.**



Computer Cookie Cutters

DesignStudio lets you wrap text and crop graphics inside more than a dozen different polygonal shapes.



Styles with Style

Multi-Ad Creator uses both character styles and paragraph styles; the interface makes it easy to create both.

make it attractive to PageMaker design-on-the-screen types and power tools that QuarkXPress users will approve of or, in some cases, envy.

Upon opening the program, it's immediately apparent that DesignStudio is a direct descendant of ReadySetGo. ReadySetGo users, who were originally asked to pay $325 to "migrate" to DesignStudio, may think it should have been an upgrade, but Letraset didn't see it that way. (Letraset later dropped the upgrade price to $100. According to the company, people who paid $325 can either get a $225 cash rebate or take $300 in credits toward future purchases.) In any case, if it's an upgrade in disguise, at least it's a major upgrade.

DesignStudio adds a pasteboard underneath pages so you can drag items off one page and then drag them onto other pages. You can see items move as you drag them around (but not as you adjust them), and you can set up column and ruler guides much as you do in PageMaker.

DesignStudio offers most of the typographic control you could ask for—kerning, tracking, subscripts and superscripts (including customizable baseline shifts), vertical alignment and justification, and excellent hyphenation controls. There's even a feature for automatically building fractions. DesignStudio lacks justification controls, though, and a horizontal type-scaling feature (there are options for condensed and expanded type, but you can't choose the percentage). There are some clunky implementations, though, that seriously limit the program's usability. The limitations have mostly to do with memory. Rotation is the worst offender (and rotation is one of the main reasons to buy DesignStudio.) In addition, the only things you can undo are delete, cut, clear, move, and resize.

DesignStudio's other shortcoming, which it inherited from ReadySetGo, lies in its style sheets. You can build styles that include both paragraph and character formatting (betraying the fuzzy distinction between the two levels in Letraset's programs), and you can apply styles to any selection of text. But when you apply a style, it supersedes any local formatting, such as italics. And once you have applied a style, you can't apply local formatting to the same text without first removing the style. It's wrongheaded, infuriating, and in a program that's otherwise so impressive, disappointing.

Also like its predecessor, DesignStudio doesn't import Word styles (or even the tags specifying what type of style different paragraphs are supposed to be), and it doesn't import Word's hanging indents.

Most other things about this program are great, starting with irregularly shaped text and graphics frames (see "Computer Cookie Cutters"). These frames can crop graphics and form text into more than a dozen odd shapes. And you can rotate any page element in 1-degree increments. The Annexes option gives you the ability to add menu items and features; Annexes included in version 1.0 let you edit kerning and tracking tables, get a list of fonts and pictures used, and strip downloaded fonts from printed-to-disk PostScript to speed printing and cut file size. Upcoming Annexes include DesignScript, a page-layout command language that will let traditional composition systems and databases spec full pages, and DesignStudio separator, a process separation utility (announced price, $395).

DesignStudio lives up to its name and price; it is a full-blown designer's tool, appropriate for people designing pages day in and day out. Its brain-damaged style sheets, memory limitations, and lack of Undo for many functions make it much less useful for production publishers than PageMaker or QuarkXPress, however, and more casual users will probably balk at DesignStudio's complexity.

Multi-Ad Creator 2.0

You probably haven't heard of Multi-Ad Creator, from Multi-Ad Services. Even though the first version of this single-page–layout program was impressive, it didn't get much play in the

press or the page-makeup community. That lack of attention may be remedied with the release of version 2.0, which is, in simple terms, a great program. It embodies one possibly fatal design decision, however—it handles only single pages.

If you're familiar with PageMaker's interface you'll be comfortable with Multi-Ad Creator. The pasteboard, ruler guides, ⌘-key zooming, grabber hand, flowing text blocks, placing conventions (no need to create frames first), and block-to-block text flow are all similar to PageMaker's, but in most cases better. You can't see most objects (just bounding boxes) while you're moving or scaling them, though, with the exception of Creator-created graphics.

While all these features are attractive, Multi-Ad Creator's multilayout approach is a godsend for designers. You can design the same page—with the same elements—many different ways, and store all the layouts in one document. No more Save As with a dozen cryptically named files on disk. You can flip through alternate layouts, see them side by side, or print them all. Creator will even suggest layouts, based on rules you specify.

Multi-Ad Creator's typographic controls are good, but it lacks automatic tracking, forced justification (surprising and unfortunate), and control over justification parameters. The style sheets, however, are the best designed and best implemented of any I've seen for the Mac (see "Styles with Style"). You can set up both paragraph and character styles, and within paragraph styles you can specify any character style for the text (and yes, local formatting overrides styles). There are even Style Models that automatically apply styles to successive imported paragraphs or text regions as they hit the page. Creator does not import Word's styles, however, or any paragraph formatting—only character formatting—which is not such a big problem in a single-page environment.

Creator offers a good complement of drawing tools, including polygons and comic book–style starbursts—but not including a bezier-curve tool (smoothed polygons are the substitute). You can wrap text inside or outside any of these shapes automatically (but you can't use them to crop pictures), and you can even ask Creator to copyfit—adjust type size and rewrap text iteratively within a frame until it fits. Multi-Ad Creator produces either spot-color overlays or process separations—including separations of scanned color images, even 32-bit files.

The trade-off for all this power is sluggish performance. The high price and slow speed put this program out of the ballpark for anyone except full-time ad designers with ample budgets. And if you do any multiple-page work, you'll need one of the other programs in addition to this one.

Publish-It

This compact, speedy, assembly-language program first emerged under the name Scoop, from Target Software. It's been heavily debugged since then, the menus are rearranged logically, and there's excellent online help and documentation, but Publish-It's feature set is essentially the same as Scoop's.

Publish-It has page-makeup, draw, paint, and word processing tools—too many to detail here—at a reasonably attractive price ($495). The program

WHAT ABOUT INTERLEAF?

Interleaf Publisher 3.5—all 700 files and 9 megabytes of it—is an obvious stranger to the Macintosh. It doesn't use the Mac interface; the desktop, mouse clicks, menus, and dialog boxes all work differently from what you expect. It doesn't use the Apple print manager, so it won't print on non-PostScript printers. The current version uses installed fonts, but if you have a good collection, the program runs out of menu space (with my system, it stops around Palatino). It doesn't download fonts automatically, so you have to manually download anything that's not already in your printer. It ignores Adobe Type Manager. Finally, Interleaf must be installed on the start-up disk and recognizes that disk only. (I left Interleaf Publisher out of the feature comparison chart because it's just too different from all the others.)

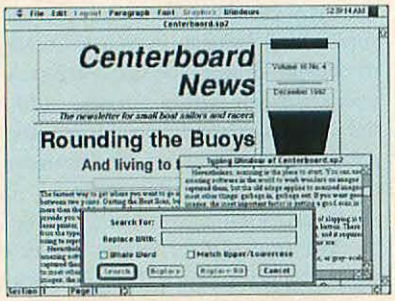
OK, Interleaf Publisher is not, at heart, a Mac program. Nor is it typographically sophisticated. So what is it?

Interleaf is a program for publishing long documents; it runs on a variety of workstation platforms—Mac, IBM PC, and several UNIX boxes—and has special strengths for technical publishing. It's more like a megapowered WYSIWYG word processor than a page-makeup program. It's a tool for people who move thousands of black-and-white pages a year, who don't care much about typographic sophistication, and who have the hardware setup necessary for that kind of work.

Interleaf lets you automate production to a greater degree than other Mac programs. There's automatic figure numbering, cross-referencing, indexing, table-of-contents generation, vertical justification, column balancing (so that columns on the last page of a multicolumn document end up an equal length), graphics that float with anchors in the text, and a robust diagramming environment (including drawing and business graphics tools).

To take advantage of Interleaf's powers, you'll need a very sophisticated operator—preferably one who doesn't balk at a bit of programming. With that kind of proficiency (and the appropriate programming tools—be they BASIC or UNIX), you can automate publishing tasks to the point that Interleaf automatically builds a weekly report for you, reading, filtering, cleaning up, and formatting files from several sources, all without human intervention.

While Interleaf offers features you won't find in any other Mac program, it goes beyond being uncomfortable in the Mac environment; it's actively hostile. It imposes enough penalties that you have to wonder why you aren't using a UNIX platform—a Sun workstation or the like—with all the multiprocessing, multitasking, and myriad utilities UNIX provides.



Last-Minute Corrections

Springboard Publisher II's Typing Window works like the Story Editor in PageMaker 4, making it easy to edit late in the process.



Midwest retailer Jacks produces a 20-page newspaper supplement every week. The in-house advertising team now uses QuarkXPress with Cyberchrome scans and separations to produce all-desktop color pages like this one.

lets you use many draw tools (align, rotate, and so on) for page makeup, which is nice, but overall Publish-It's interface is clumsy. I reviewed this program in January (see *Reviews*, January 1990), and I'll reiterate the conclusion therein: you should buy this program if (1) you have a 512KE, Plus, or SE and need a small, fast program; or (2) you can't afford a separate draw program.

Publish-It is too ungainly for full-time page makers (in this price range, check out QuarkStyle), but if you are on a budget and don't mind wading through bottomless menus to get to a bottomless set of features, it's worth a look.

QuarkStyle

For about $200 less than Publish-It and ReadySetGo, you can get QuarkStyle—a pared-down version of QuarkXPress aimed at the casual page maker. Don't pay attention to Quark when it claims this program has nothing to do with XPress (it patently does) or that the included designer templates, sans style sheets, will make you an instant publisher (they won't).

QuarkStyle is an excellent choice for the occasional publisher who doesn't need all of the typographic tools of the full-blown QuarkXPress. At $295, it's a very competent performer, offering most of the tools nonprofessionals need. Later, if you decide you need more power, Quark will credit your full $295 toward the price of QuarkXPress. If you do upgrade, QuarkXPress will be able to open all your Style documents.

Springboard Publisher II

Are you looking for a page-makeup program for less than $200? Springboard Publisher is it. It's no toy, and I've seen it advertised for under $100. For that price you can't expect many power tools, but if you occasionally need to produce reports, brochures, or the like, you'll find the basic facilities you need here.

You can create frames for text and graphics; lay out columns of type easily; wrap type around graphics automatically; draw lines, boxes, and ovals; create and edit bitmapped art (at 72 dpi) right on the page; and number pages automatically. There's an ingenious dialog box for linking text frames—it's not as easy as clicking on successive frames, but it works nicely. And a separate typing window makes editing much easier than working on the page.

So what's missing? You're limited to full-point increments for type size and leading; you can't edit when you're zoomed out; you can't zoom with a ⌘-click; you don't have a pasteboard, or a grabber hand for moving the page around; you must shift to a separate mode to create and modify lines, boxes, and ovals; and—you may find this to be Springboard Publisher's fatal flaw—you can't fill frames, rectangles, or circles with percentage fills. Object grays and patterns can be applied only to the lines *around* frames. The only fills are 72-dpi bitmaps.

Aside from the fill problem, Springboard Publisher is a capable little program for the casual page maker. It comes with Smart Art, an excellent graphics utility from Emerald City Software, and its price is hard to beat.

Your Way

Designers who want to try out ideas on screen should look at PageMaker, DesignStudio, or Multi-Ad Creator (and, if the beta's promise is realized, Xpress 3.0). Creator is the best choice for single-page work, especially for trying out multiple designs (and it does process separations). If you need multiple-page capability, you'll have to decide between DesignStudio's rotation capabilities and irregularly shaped frames, and PageMaker's excellent style sheets and superior interface. With the current state of DesignStudio (memory problems, limited undos), PageMaker is the better choice.

Production publishers—people who are moving lots of pages—should choose between PageMaker's sleek interface and excellent long-document features, and QuarkXPress's plan-ahead, frame-based approach and precision. The decision is largely a matter of operating style. If you do multiple-page, process-color work, however, QuarkXPress is the obvious choice.

Occasional and undemanding users are best off with QuarkStyle. If you're just starting out and want to get a feel for page makeup, try Springboard Publisher; the price won't set you back much, so you can always move up to another program later.

The two midpriced alternatives, ReadySetGo and Publish-It, fall in the hole between the top-end tools and QuarkStyle. ReadySetGo and Publish-It are more practical to use on lower-powered machines and ReadySetGo is well-established and reliable. Their prices are close enough to the top-end tools, though, that unless you are working with an early machine that can't handle the big guns, you have to think seriously about buying PageMaker, QuarkXPress, DesignStudio, or Multi-Ad Creator instead. Ⓜ

See *Where to Buy* for contact information.

Steve Roth *writes, edits, and produces books in Seattle. His recent projects include* Real World PageMaker 4 *(Bantam Computer Books 1990) and* ScanJet Unlimited *(Peachpit Press, 1990).*



Users are finding that a Mac and a VAX working together are better than either working alone

Mac to VAX and Back

For many Macintosh users, the world of Digital Equipment Corporation's VAX is an alien one. It needn't be, however. The VAX has many capabilities to offer the Mac: processing power and hard disk space are among the most important. Reciprocally, the Mac complements these VAX features with its interface and graphics capabilities.

MICK WIGGINS

By Brita Meng

Recognizing the potential for a productive partnership between the Mac and VAX, Apple and DEC embarked on a joint R&D agreement in 1988 (see "Two Years Later"). While Apple and DEC concentrate on network protocols and tools that enable Mac-to-VAX networking—both companies call it plumbing—third-party vendors are providing a wide variety of high-level products to help Macs and VAXs work together more closely.

Among the products available are file servers, print spoolers, electronic mail (E-mail) gateways, and file-format exchange utilities. In addition, a new breed of application is starting to make its impact felt in the Mac-to-VAX world. Unlike current applications that work primarily on either the Mac or the VAX, cooperative applications operate on both computers simultaneously.



JONATHAN LEVINE

Chuck Zoeller, a photo editor at Associated Press in New York, takes advantage of AP's Mac-to-VAX combination when creating and distributing graphics to more than 700 member newspapers.

A *distributed* application shares information and is split among two or more computers. Mac-to-VAX products offer three different ways to distribute an application over a network: distributed user interface, distributed data access, and distributed processing (see "Friendly Relations").

You Drive, I'll Steer

First, a Mac can act as a front end for VAX applications. In this relationship, the bulk of the processing occurs on a VAX; the Mac handles only the user interface. The distributed user interface is the simplest way to connect a Mac and VAX.

Of all the approaches to distributing a user interface, terminal emulation is the most basic. You will find a wide variety of terminal-emulation software—offering simple VT100 to sophisticated Tektronix 4107 graphics capabilities—available for the Mac. Terminal emulation provides a way for the Mac to access and run VAX applications; however, it takes very little advantage of Mac capabilities. When it's emulating a terminal, a Mac looks just like that terminal, command-line interface and all.

Happily, there are ways to provide a Mac-like interface for the VAX. List SpA's Makeasy and MacNix let you assign Mac-like icons to VAX files under DEC's VMS or Ultrix operating systems, respectively. Alisa Systems' MaxNotes is a Mac front end to DEC's VAX Notes electronic conferencing facility. MacNow from Telos provides a Mac-like interface for DEC's All-In-1 office-automation software.

Several third-party vendors utilize HyperCard to provide VAX applications with front ends that are more sophisticated than terminal emulators. For example, Sybase and Oracle each offer application programming interfaces (APIs) in the form of HyperCard external functions (XFCNs). Sybase and Oracle let you develop custom interfaces to their respective VAX-based relational database-management systems (RDBMS). A Macintosh networked to the VAX via AppleTalk or DECnet can then access information in those databases. Techgnosis's SequeLink provides HyperCard-based SQL links to several different VAX-based databases—Oracle, Ingres, Rdb, and Sybase—over AppleTalk and DECnet.

MacWorkStation, Apple's programming tool kit, offers a more Mac-like alternative to terminal emulators. Rather than relying on a Mac application like HyperCard, MacWorkStation provides VAX applications themselves access to standard elements of the Mac interface: windows, dialog boxes, and so on. Thus, a Mac uses its own interface, instead of the VAX interface, to run the VAX application. (MacWorkStation requires minimal modification of the VAX application.) A good example of a MacWorkStation-based program is Integrated Solutions' Central System Manager, which enables VAX system managers to control a VAX network from a Mac.



DRAKE SORREY

KQED operates a monthly magazine, a PBS radio station, and two television stations in San Francisco. Using Macs and VAXs, the company finds it can lower operating expenses.

X Marks the Spot

The X-Window System offers another alternative for users who want to employ the Mac as a front end to VAX applications. Developed at MIT, X-Window has become a widely accepted windowing and graphics standard. In fact, DEC's graphical user interface, DECwindows, is based on the X11 standard (the *11* stands for the version number).

Unlike programs that use the Mac interface, applications written to X-Window specifications can run on a variety of computers, not just the Mac. X-Window also allows its applications to be distributed between two computers on a network. One computer, the *X server,* performs all graphic-display operations and manages mouse and keyboard input. (Think of it as providing the user interface for any X-Window application.) The functional part of the application runs on the other computer, or *X client.*

Currently, there are no Mac X client programs available. This means VAXs can't use X-Window to run Mac applications. However, the Mac can use one of two available X server programs to run DECwindows programs: White Pine's eXodus, which is MultiFinder-compatible, or Apple's X-Window for A/UX, which runs under

Apple's version of the UNIX operating system (see "A/UX 2.0 Puts a Mac Face on UNIX Applications," *Macworld News*, May 1990). A second MultiFinder-compatible X server, MacX from Apple, is not yet available.

Service with a VAX

In distributed data access, most of the application you are using resides on the Mac, not the VAX. The Mac program then uses information and files stored on the VAX as data. In other words, the VAX becomes a server to the Mac client.

One facet of distributed data access is the ability of the Mac to take advantage of VAX print spooling capabilities. For example, Alisa Systems' AlisaPrint, Pacer Software's PacerPrint, and K-Spool from Mt Xinu let the VAX act as a LaserWriter spooler for a Mac-to-VAX network. Not only can Mac users print to a LaserWriter (or equivalent PostScript printer) on the Mac-to-VAX network, but VAX users can too.

Another aspect of distributed data access involves file services. By using the VAX as a file server, the Mac takes advantage of the VAX's hard disk space. A bonus to storing files on the VAX is that most VAXs are regularly backed up, unlike many Macs.

From the Macintosh users's point of view, VAX file servers take two forms: AppleTalk Filing Protocol (AFP)–compatible and non-AFP-compatible. AFP-compatible servers let Macs use the VAX as an AppleShare server. Any files on the VAX appear as icons on the Mac. Those files, depending on their format, can usually be accessed by VAX users as well (see "Friendly Relations").

AlisaShare and PacerShare both let

TWO YEARS LATER

Since their agreement in January 1988, Apple and DEC have made real progress toward resolving the architectural and philosophical differences between AppleTalk and DECnet, and toward offering developer tools for Mac-to-VAX connectivity. Both companies have laid the groundwork for future Mac-to-VAX products—not only from Apple and DEC, but also from third-party vendors. Although numerous end-user products from third-party developers now exist, end-user products from Apple and DEC have been slow in coming.

Apple's Communications Toolbox extends the Mac Toolbox into the networking and communications arena by providing standard programming interfaces to data-connection, terminal-emulation, and file-transfer capabilities. Initial interfaces include ones for DEC VT100 and VT320 terminal emulation. Apple has also announced that it will offer a Communications Toolbox interface for DEC's proprietary Local Area Transport (LAT), a very efficient Ethernet-based protocol for data transfer.

Managers of large Mac-to-VAX networks got good news when Apple finally decided to offer AppleTalk Phase 2 support in AppleTalk for VMS version 2.1. Before Phase 2, Mac EtherTalk (AppleTalk over Ethernet cable) networks could handle only 254 nodes; with Phase 2, that limit has been upped to 16 million.

Version 2.1 improves network routing performance, but expect to see even greater performance gains when the much anticipated (and as yet unannounced) AppleTalk for VMS version 3.0 is released. Version 3.0—a total rework of the current product—will move some of the AppleTalk protocol handling into *kernel mode* in VMS, putting AppleTalk on a par with other input/output (I/O) services on the VAX. (Right now, VMS gives lower priority to AppleTalk handling than to its own I/O services.)

Apple and DEC are also jointly developing VAX software that acts as an AppleTalk-DECnet transport gateway. Similar in concept to Apple's Internet Router, the AppleTalk-DECnet gateway will offer connections between AppleTalk and DECnet networks via the VAX.

The capability to share files between a Mac and VAX means nothing if both Mac and VAX applications can't read those files. For this reason, file formats have become an important issue in the Mac-to-VAX world.

Apple and DEC have selected the Digital Document Interchange Format (DDIF) as the primary file-interchange format. A part of DEC's Compound Document Architecture (CDA), DDIF is DEC's format for encoding text, graphics, and images on VAXs.

Since DDIF obviously differs from any Mac file formats, converting Mac documents to and from DDIF will require translators. DEC is now testing DDIF converters for MacWrite, MacPaint, and PICT on the VAX. Apple has also announced plans to provide an Apple File Exchange translator that converts DDIF files to and from MacWrite, MacPaint, and PICT formats; however, that translator is not expected to appear in the near future.

DEC, for its part, has announced several Mac-based products. The first is a Mac client that allows users on the Mac to directly access All-In-1 Phase II, DEC's integrated office system on DECnet. Part of that client may very well be a DECnet tool for the Communications Toolbox. DEC will also offer a Mac client version of SQL Services (its SQL-based scheme for Rdb database access) as well as support CL/1 (Apple's SQL-database connectivity language).

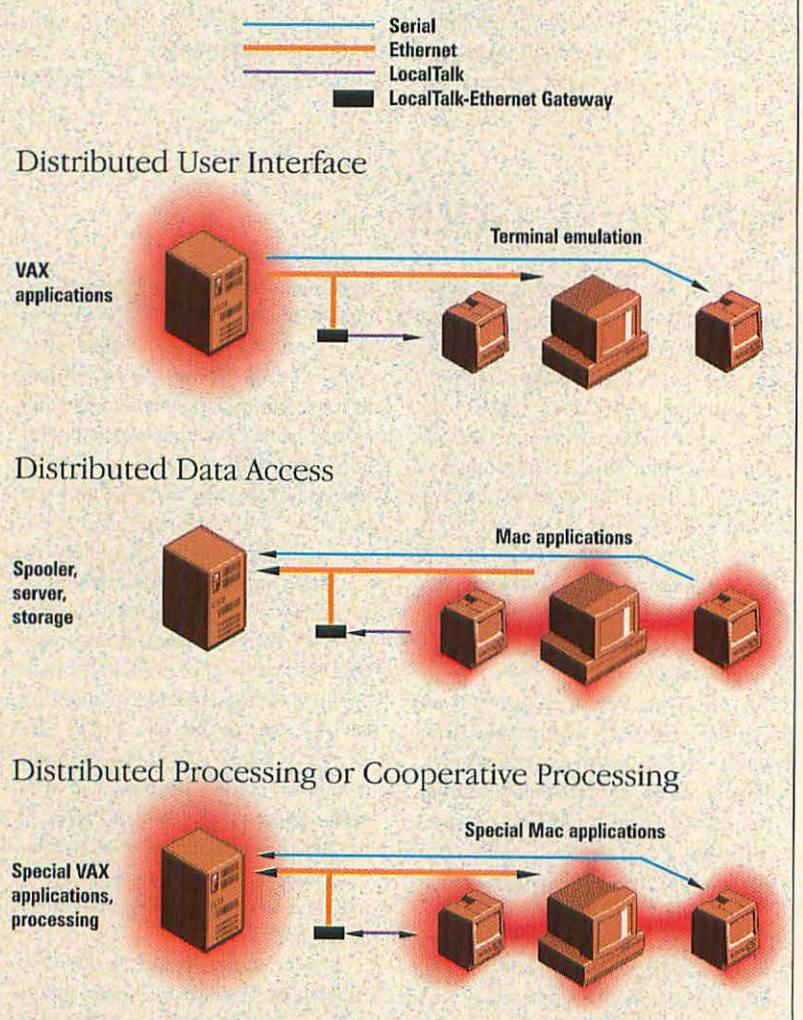
DEC has also stated its intention to offer a Macintosh version of its VMS Services for PCs, a move that many anticipated after DEC licensed technology from two Alisa products, AlisaShare and AlisaPrint. Because those products utilize AppleTalk protocols, it's expected that VMS Services for Macs will use AppleTalk protocols to provide Macs access to file servers and other DECnet services. That approach differs considerably from the one taken by VMS Services for PCs, which currently uses DECnet protocols.

a VAX running the VMS operating system function as AFP-compatible file servers. Pacer also offers a version of PacerShare for VAXs running DEC's Ultrix operating system. Cayman Systems' GatorShare provides file sharing between Macs and VAXs that use Sun's Network File System (NFS).

As for non-AFP-compatible file servers, Pacer has announced a version of TOPS for the VAX, called PacerTOPS, which allows Mac, PC, and VAX VMS users to share files stored on the VAX. Datability offers MacRAF, a Mac version of its Remote Access Facility (RAF), that enables file transfers and file serving on Ethernet networks.

Like file servers, mail servers often require regular backups and lots of disk space—two things the VAX readily offers. It's not surprising, then, that two products, PacerPost from Pacer and Alisa's AlisaMail, now enable the VAX to function as a Microsoft Mail server, accessible to both Mac and PC Microsoft Mail users. In addition, Pacer and Alisa provide gateways that permit PacerPost and AlisaMail users to take advantage of DEC's mail services, including VAX VMS Mail and All-In-1 Mail programs.

FRIENDLY RELATIONS



The primary goal of a Mac-to-VAX network is to enable both Macs and VAXs to share three types of resources: information, network devices, and computing tasks. Distributed applications provide that ability. VAX-based applications can take advantage of the Macintosh interface by using the Mac as a front end (top). Distributed data access enables Macs to use either local or networked VAX resources such as hard disks or printers (middle). The ultimate goal for distributed applications is to permit Macs and VAXs to split computing tasks, or distribute processing over a network (bottom). By working cooperatively, each computer can do what it's best at. For example, the Mac would handle the user interface or graphics, the VAX would manage the database or do the number crunching.

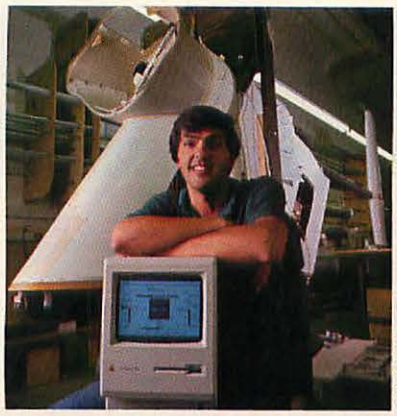
Database Access

Retrieving information from VAX-based databases with Macs is probably the most-talked-about aspect of distributed data access. That's because many corporate databases traditionally reside on the VAX.

CL/1, Apple's connectivity language extension to Structured Query Language (SQL), is one way to accomplish that kind of data retrieval. It allows a Mac running a CL/1 client application to request data from VAX-based SQL databases. Those Mac requests are handled by a VMS application called the CL/1 Server. In addition, CL/1 enables the same Mac application to find out what databases are available on a VAX; determine the structure of the VAX databases; and insert, delete, and update data in them. Databases currently supported by CL/1 include DEC's Rdb file system, and databases from Oracle, Ingres, Informix, and Sybase.

DEC also offers its own option for database access, SQL Services. Unlike CL/1 clients, SQL Services clients can access information only from Rdb databases. Because of this specialization, SQL Services offers better performance with Rdb than does CL/1. A Mac client for SQL Services is currently under development by DEC.

Helix VMX, a client-server version of Odesta's Mac database Double Helix, also permits the VAX to operate as a database server. Helix applications are developed on the Mac, then downloaded to the VAX over Ethernet. Both



APPLE COMPUTER, INC.

Besides linking offices, the Mac-to-VAX network at Los Angeles–based AeroVironment is used by engineers like Graham Gyatt to develop projects such as the Hiline, a remotely piloted vehicle.

Macs and VT terminals can share information in these databases.

Sharing the Load

Finally, there is distributed processing, the most symbiotic Mac-to-VAX relationship. In distributed processing, the two computers are peers. Each computer works independently until one needs the capabilities of the other: in other words, separate applications running on the Mac and VAX cooperate. A Macintosh CAD program, for example, could call upon a VAX finite-element analysis application to perform a stress calculation on a designed part. Once that calculation is done, the VAX sends its result back to the Mac, which accordingly updates the CAD display.

Several Mac application vendors are using CL/1 to provide a form of cooperative processing. Odesta's GeoQuery and Tactics International's FastMap can manipulate, then access, data in VAX-based SQL databases to draw informational maps on the Mac. Microsoft Excel, Full Impact from Ashton-Tate, Informix's Wingz, and Fairfield Software's Clear Access (a DA) can import data from those databases for spreadsheet analysis and charting. In addition, many applications support cooperative processing via APIs based on MPWC from Oracle, Sybase, and Techgnosis in applications.

MAC-TO-VAX PRODUCTS

Company	Product	Protocol	Connections*	Software Resides On	VAX Operating System	Mac Price †	VAX Price †
File Servers and File Transfer							
Alisa Systems	AlisaShare (AlisaTalk)	AppleTalk	G, E	VAX	VMS	n/a	$4700+‡
Cayman Systems	GatorShare	AppleTalk, TCP/IP (NFS)	G, E	GatorBox	Ultrix, UNIX, VMS	$1995§	n/a
Datability Software	MacRAF	DEC LAT	E	Mac, VAX	VMS	$495	n/a
InterCon Systems	TCP/Connect II	TCP/IP (Telnet)	G, E	Mac	Ultrix, UNIX	$495	n/a
Mt Xinu	K-Share (K-Talk)	AppleTalk	G, E	VAX	Ultrix, UNIX	n/a	TBA
	Xinet	AppleTalk (TOPS)	G, E	VAX	Ultrix, UNIX	n/a	$895+
Novell	LAN WorkPlace	TCP/IP	G, E	Mac	Ultrix, UNIX	$250	n/a
Pacer Software	PacerShare-VMS (PacerLink)	AppleTalk	G, E	VAX	VMS	n/a	$2400+
	PacerShare-Ultrix/UNIX (PacerLink)	AppleTalk	G, E	VAX	Ultrix, UNIX	n/a	$2400+
	PacerShare-RISC/Ultrix (PacerLink)	AppleTalk	G, E	VAX	Ultrix, UNIX	n/a	$2400+
	PacerTOPS (PacerLink)	AppleTalk	G, E	Mac, VAX	VMS	n/a	$2400+
The Wollongong Group	MacPathWay Access	AppleTalk, TCP/IP	G, E	Mac	Ultrix, UNIX	$179	n/a
Touch Communications	TouchFiler (Touch OSI for the Mac)	OSI	E	Mac, VAX	VMS	$395	$3000+
Touchstone Software	MacLine	AppleTalk	S	Mac, VAX	Ultrix, VMS	$145	n/a
White Pine Software	VMacS	Kermit, Xmodem	S	VAX	VMS	n/a	$399
Print Servers							
Alisa Systems	AlisaPrint (AlisaTalk)	AppleTalk	G, E	VAX	VMS	n/a	$4700+‡
Cayman Systems	GatorPrint	TCP/IP (lpr)	G, E	GatorBox	Ultrix, UNIX	$595§	n/a
Mt Xinu	K-Spool (K-Talk)	AppleTalk	G, E	VAX	Ultrix, UNIX	n/a	$495
Pacer Software	PacerPrint (PacerLink)	AppleTalk	S, G, E	VAX	VMS	n/a	$1000+
Touch Communications	TouchPrint (Touch OSI for the Mac)	OSI	E	Mac, VAX	VMS	$395	$3000+
Mail Servers and Gateways							
QuickMail							
Alisa Systems	MailMate/QM	DECnet	S, G, E	Mac	VMS	$950+	n/a
Cayman Systems	GatorMail-Q	TCP/IP (SMTP)	G, E	Mac	Ultrix, UNIX	$995+	n/a

*S = serial, G = gateway, E = Ethernet device. † a = internal development license, b = commercial development license, c = site license, d = single license, e = run-time license.

‡ Price includes AlisaShare, AlisaPrint, and AlisaTerminal. §Price is software only; GatorBox costs $2795. ¶Includes Hyper SQL and Pro C APIs. ||Can also use Pacer Software's PacerLink.

MAC-TO-VAX PRODUCTS (CONTINUED)

Company	Product	Protocol	Connections*	Software Resides On	VAX Operating System	Mac Price ‡	VAX Price ‡
Microsoft Mail							
Alisa Systems	AlisaMail	AppleTalk	G, E	VAX	VMS	n/a	$10,000+
Cayman Systems	GatorMail-M	TCP/IP (SMTP)	G, E	Mac	Ultrix, UNIX	TBA	n/a
Pacer Software	PacerPost	AppleTalk	S, G, E	VAX	VMS	n/a	$2000+
Front ends							
Alisa Systems	MaxNotes	DECnet	S, G, E	Mac	VMS	$295	n/a
Apple Computer	MacX	AppleTalk, DECnet, TCP/IP	G, E	Mac	Ultrix, UNIX, VMS	$299	n/a
	X-Window for A/UX	TCP/IP	E	Mac	Ultrix, UNIX, VMS	$329	n/a
List SpA	Makeasy	AppleTalk, DECnet	G, E	Mac, VAX	VMS	n/a	$4000+
	MacNix	TCP/IP	G, E	Mac, VAX	VMS	n/a	$2400+
Oracle	Oracle for Macintosh Developer Version#	DECnet, TCP/IP	S, G, E	Mac	Ultrix, UNIX, VMS	$199	n/a
Sybase	Open Client, Hyper/DB-Library	DECnet, TCP/IP	S, G, E	Mac	Ultrix, UNIX, VMS	$195	n/a
	Open Client, DB-Library	DECnet, TCP/IP	S, G, E	Mac	Ultrix, UNIX, VMS	$195	n/a
Techgnosis	SequeLink	AppleTalk, DECnet	G, E	Mac, VAX	VMS	$195	$4995
Telos	MacNow	AppleTalk, DECnet	S, E	Mac, VAX	VMS	$200	$3000
White Pine Software	eXodus	DECnet, TCP/IP	S, G, E	Mac	Ultrix, UNIX, VMS	$499	n/a
File Formatters							
Interpreter	SmartKid	AppleTalk, Kermit	S	Mac, SmartKid	VMS	n/a	$4500
Keyword Office Technologies	Keypac	Kermit	S	VAX	VMS	n/a	$1000+
Protocol Drivers (End User)							
Alisa Systems	TSSNet	DECnet	S, G, E	Mac	VMS	$495	n/a
Apple Computer (APDA)	MacTCP	TCP/IP	G, E	Mac	Ultrix, UNIX	$100 d	n/a
Computer Methods	AsyncServer for VAX/VMS	AppleTalk	S	VAX	VMS	n/a	$750+
EMAC	CommUnity-Mac	DECnet	E	Mac	Ultrix, VMS	$495	n/a
Protocol Drivers (Developer Tools)							
Apple Computer (APDA)	AppleTalk for VMS	AppleTalk	G, E	VAX	VMS	n/a	$1000
	CL/1 Server	AppleTalk, DECnet	G, E	Mac, VAX	VMS	n/a	$1000 a
	for VAX/VMS					n/a	$5000 b
	MacTCP	TCP/IP	G, E	Mac	Ultrix, UNIX	contact Apple c	n/a
	MacWorkStation	RS-232 ASCII	S	VAX	VMS	n/a	$100 d
						n/a	contact Apple c
Mt Xinu	K-Talk	AppleTalk	G, E	VAX	Ultrix, UNIX	n/a	$3500 c
Novell	TCPort	TCP/IP	G, E	Mac	Ultrix, UNIX	$2500 a	n/a
						$5000 b	n/a
Cooperative Applications							
CompuServe Data Technologies	WindowMate	Proprietary‖	S	Mac, VAX	VMS	$150	n/a
Deft	Deft	RS-232 ASCII	S	Mac, VAX	VMS	$9000	$10,000+
Integrated Solutions	Central System Manager	DECnet	S, G, E	Mac, VAX	VMS	n/a	$1449+
Odesta	Helix VMX	AppleTalk	S, G, E	Mac, VAX	VMS	n/a	$4500+
	Odesta Document Management Systems	AppleTalk	S, G, E	Mac, VAX	VMS	n/a	$10,000+ e $25,000+ b
Oracle	Oracle for Macintosh Networking Version#	DECnet, TCP/IP	S, G, E	Mac, VAX	Ultrix, UNIX, VMS	$999	n/a
Software AG	Natural Architect Workstation	RS-232 ASCII	S	Mac, VAX	VMS	<$8000+	$6000+

*S = serial, G = gateway, E = Ethernet device. ‡ = internal development license, b = commercial development license, c = site license, d = single license, e = run-time license.

‡ Price includes AlisaShare, AlisaPrint, and AlisaTerminal. ‖Price is software only; GatorBox costs $2795. #Includes Hyper SQL and Pro C APIs. ‖Can also use Pacer Software's PacerLink.

Deft is a computer-aided software engineering (CASE) system that maintains and tracks elements of a software program during the development process—specification, design, and actual coding. Deft includes two cooperating sets of software. The first is the Mac-based Editor Set, which enables users to diagram various aspects of a program under development. The second, the Gateway, takes information from the Editor Set, translates it into SQL, and feeds it directly to a repository database on the VAX. Each part continuously updates the other.

A Mac-based E-mail gateway, such as Alisa's MailMate/QM, is another example of distributed processing. These gateways allow a Mac mail program to use a VAX-based E-mail application to deliver mail to VAX users; similarly, the VAX E-mail program can store and forward mail for Mac users by connecting to the Mac mail server. Each E-mail system functions independently, but they cooperate to get mail from one system to the other.

Things to Consider

Before picking a Mac-to-VAX product, you must decide which distributed capabilities—interface, data access, or processing—you need. The services you choose determine not only the type of connection—serial or Ethernet—to install between the Mac and the VAX, but also the network protocol—AppleTalk, DECnet, or TCP/IP—to run on the Mac-to-VAX network (see "Following Protocol").

As far as physical cabling is concerned, you'll get the best overall performance by using Ethernet to connect a Mac to a VAX. Although some Mac-to-VAX products can directly link the Mac and VAX with a serial cable or modem, you'll find performance limited by the speed of serial links. Even for terminal emulators, Ethernet may be a good choice, because of Apple's announced support for DEC's Local Area Transport (LAT) protocol. LAT is a low-level communications protocol optimized for terminal traffic on Ethernet local-area networks (LANs).



JONATHAN LEVINE

Aetna Life Insurance Company's Employee Benefits Division links 72 branches nationwide using a network that includes 30 MicroVAX 3400 computers and approximately 1000 Macs.

Ethernet has another advantage besides performance; it's a multiple-protocol medium. That means you'll be able to run more than one protocol over the same cable. If the Mac-to-VAX services you want require both AppleTalk and DECnet or TCP/IP, Ethernet is a must for your Mac-to-VAX network.

You can connect a Mac to Ethernet with either a LocalTalk-to-Ethernet gateway, an Ethernet add-in board, or a SCSI-based Ethernet device. (For more information on Ethernet interfaces for the Mac, see "On the Ethernet Highway," *Macworld,* March 1990, and "Network Connections," *Macworld,* November 1989.)

As things now stand, there are a number of options available for linking the two different worlds of Mac and VAX (see "Mac-to-VAX Products"). Many of these products existed before Apple and DEC announced their partnership, and there's no doubt that even more will appear as third-party vendors take advantage of both companies' networking strategies. By exploiting the complementary characteristics of both computers, Mac and VAX users can indeed have the best of both worlds.

See *Where To Buy,* under "Mac-to-VAX Products," for contact information.

FOLLOWING PROTOCOL

Network protocol suites bridge the gap between Ethernet cable and user services. The Mac's native network is, of course, AppleTalk. By installing AppleTalk protocols on the VAX, the VAX becomes just like any other node on an AppleTalk network; for example, the VAX can act as a file server or print server. Apple's AppleTalk for VMS provides AppleTalk protocols to VAX computers running the VMS operating system. Another implementation of AppleTalk protocols for the VAX running VMS, Computer Methods Corporation's AsynchServer, enables users dialing into a VAX to use AppleTalk services. Then there's Mt Xinu's K-Talk, which puts AppleTalk protocols on VAXs running either the UNIX operating system or Ultrix, DEC's version of UNIX.

The VAX, meanwhile, has its own native network, called DECnet. There are two implementations of DECnet protocols for the Mac: TSSNet, developed by Thursby Software Systems and sold by Alisa Systems, and CommUnity-Mac, developed by Technology Concepts and sold by EMAC. With either TSSnet or CommUnity-Mac installed, a Mac appears—to the VAX—just like another DECnet node on the network. And, as a DECnet node, the Mac can take advantage of any DECnet user services: E-mail, file transfer, remote data access.

Finally, another protocol that runs over Ethernet is available to both the Mac and VAX. Transmission Control Protocol/Internet Protocol (TCP/IP) has become a de facto industry standard for communications between different computer systems. It is available for VAXs running both VMS and Ultrix operating systems. Two implementations of the TCP/IP protocols exist for the Mac—Apple's MacTCP, and Novell's TCPort.



DRAKE SOREY

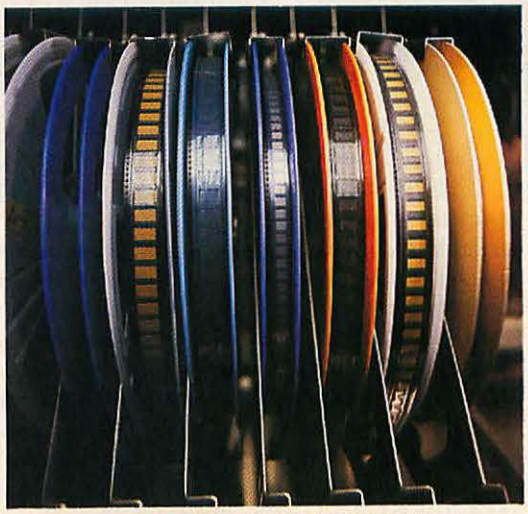
SQUARE ONE
Apple's Fremont factory produces the computers and peripherals that are responsible for 60 to 70 percent of Apple's revenue. This 160,000-square-foot board-assembly building is where Macintosh production starts. By the time a Mac is packaged 20 hours later, it will have traveled some 1300 feet on conveyor belts and lifts. About 1000 employees will have helped it on its way.

BEHIND LOCKED DOORS

by Cheryl England Spencer

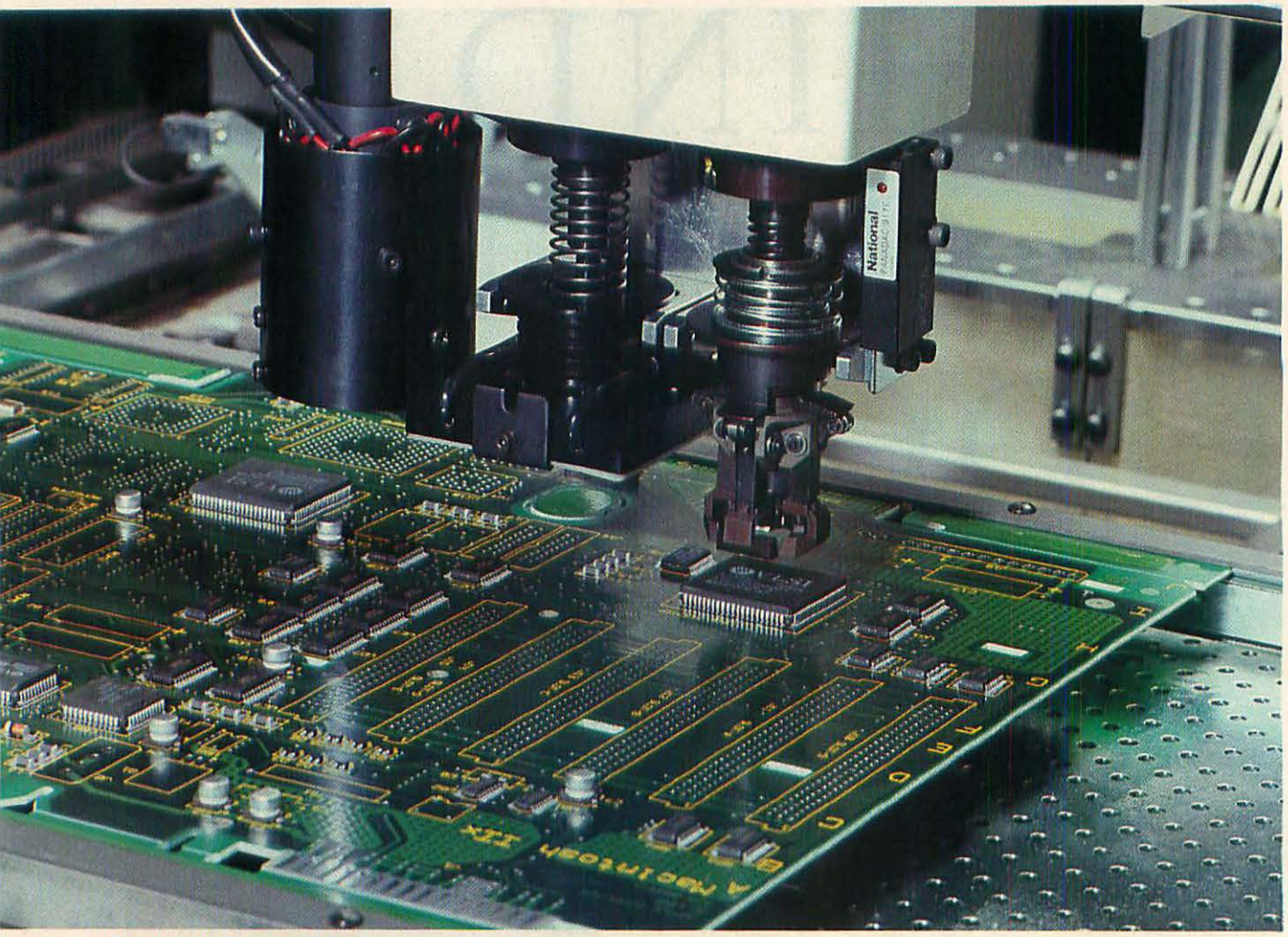
MANUFACTURING THE MAC

When the Macintosh IIcx was first introduced, Jean-Louis Gassée engaged in a brief display of showmanship. By personally assembling the computer in less than a minute he demonstrated just how easy it is to take apart and put together the IIcx. The demonstration received a lot of press, but the gist of the commentary was "Oh, a cute trick." Few people realized its significance. No other computer manufacturer—not Sun, not IBM, not even Next, with its shiny, automated board-assembly line that Steve Jobs likes to flaunt—has developed a machine that's as easy to assemble. What Gassée's stunt really signaled is that Apple has completely changed the way it makes computers.



DRAKE SORFY

THE JOURNEY BEGINS
The Mac's journey really starts here, with the chips that make up a circuit board. These chips come in strips that are wound around plastic 35mm (or larger) reels. Shown here are resistor packs (square, yellow chips), logic arrays (square, black chips), and oscillators (square, metallic chips). Once employees place these reels into automatic parts insertion machines, the factory spins into motion.



DRAKE SOREY

MACHINES IN MOTION
Automatic-insertion machines pick up each part, photograph it to ensure that it is not damaged, and swiftly place it in the correct spot on the circuit board. Placement of parts must be accurate to within 1/1000 inch. Each tool can handle five differently shaped parts down to 1/16 inch in size (Apple's smallest part is 1/8 inch); the machines can be programmed to change tools within a couple of seconds. Boards are then inspected by hand and sent to a machine that adds a layer of epoxy to secure parts such as capacitors, resistors, and diodes. Oddly shaped parts (1 percent of all parts on a Macintosh IIcx or IIci) are then placed manually.

After two sequestered years, Apple is finally starting to crack open the doors of its manufacturing facilities. We're seeing that the pace of innovation in Apple's factories has been lightning fast during the last couple of years. Leading-edge robots that were the pride and joy of Apple's manufacturing facilities two years ago have been phased out. Assembly lines have been adapted to the newer Macintoshes and, in the six months between my last visit to the Fremont factory and the publication of this article, the Macs being assembled in each of the buildings will have been reshuffled once again, with even more automation incorporated into the process.

Many of these changes are occurring because Apple realizes just how important the manufacturing process is. If the company is to continue to expand, it must be able to introduce high-quality products on a worldwide scale, within the shortest possible amount of time. In the fiercely competitive personal computer market, Apple considers technological innovation its key advantage. But Apple can't exercise this advantage if it can't bring new designs quickly to the marketplace. Yesterday's innovation is little more than yesterday's news.

To keep pace with Apple's design achievements, manufacturing must accomplish four key objectives: (1) from the

outset, products must be designed so that they are easy to manufacture; (2) for reliability, components must be standardized; (3) automation must be carefully implemented; (4) factories must be flexible enough to adapt to changing product configurations.

With these considerations in mind, I examined the insides of two Apple factories—Fremont's state-of-the-art plant and the Singapore plant. What follows is a behind-the-scenes peek at what Apple has been so quietly hiding behind locked factory doors.

Form and Function

Only a few miles from Apple's Cupertino, California, headquarters sits the Fremont factory—five buildings that house 512,000 square feet of manufacturing space. About half of the computers Apple produces come from here, as well as a majority of Apple's peripherals, such as monitors, printers, and scanners. Two other manufacturing facilities—one in Singapore and one in Cork, Ireland—churn out the rest of Apple's products.

The Fremont factory manufactures products for the United States and Canada and serves as a test bed for new products. The Singapore facility produces Macintosh SEs and SE/30s for the Pacific region and Macintosh Pluses and Apple IIs for both the Pacific and the United States. The factory in Ireland produces all products for 15 European countries.

One thing that all of these manufacturing facilities have in common is that their efficiency depends heavily on how well the Mac is designed—a fact that Apple factory workers have witnessed firsthand. "The Macintosh II was a nightmare," says Matt Carter, Apple's former production engineering manager. "We'd try to surface-mount components and the board would pop and break. If anything went wrong, we had to take the whole machine apart to fix it."

Similarly, the original SE proved troublesome. For instance, it has nine fasteners of several different types. On an assembly line, workers must place each screw, pull down the appropriate electric screwdriver from where it hangs above them, and then drive in the screw. To further complicate matters, workers must flip the Macintosh SE's chassis as it moves to various assembly stations. Viewed from above, the assembly line is a buzz of organized and rhythmic (but wasted) motion. Had this inefficiency continued, Apple would not have been able to introduce four new Macs last year, nor would its factories have come

HOMEGROWN MACHINERY
Several of the machines Apple uses are designed to perform one specific, repeatable task. This machine, which was designed and built in Fremont, rivets connectors to a board so that they stay tight while the board takes a rough ride through the wave-solder machine.



DRAKE SOREY

close to meeting demand for the new products. (Industry experts agree that Apple's troubles in meeting initial demand for the Macintosh Portable were due to a shortage of the active matrix display.)

Recognizing that streamlining production would be essential to maintaining market share, Apple reorganized so that engineering, manufacturing, and product marketing were all in the same group. The tighter focus and greater cooperation between departments worked. The Macintosh SE/30 and Macintosh IIx contain 80 percent *surface-mount* components and 20 percent *through-hole* components—a complete reversal from earlier Macs that contain only 20 percent surface-mount components. Surface-mount components are placed on the top surface of the board, while through-hole components contain pins that fit into holes on the board. Surface-mount components require less board space and less power, and work at higher speeds than through-hole components; they are also easier for machines to place correctly. But it's on the newest Macs, those engineered from scratch, that Apple's design awareness really pays off.

Just take a look back at the assembly lines. The Macintosh IIcx and IIci line seems almost languid in comparison to the Macintosh SE line. All of the parts snap in easily. The whir of the screwdrivers is almost absent. From a distance, the visitor is under the illusion that the pace of production is much slower here.

This perception is misleading. The Macintosh IIcx is 38 percent faster to manufacture than the Macintosh SE, even though the machines have a similar number of components (not counting the Macintosh SE's monitor). The faster assembly is due to the Macintosh IIcx's snap-in parts, surface-mounted chips, and Apple's ability to integrate more functionality into fewer chips. The fact that the Macintosh IIcx, the more capable (albeit more expensive) machine, requires so much less time to make than the Macintosh SE illustrates the benefits of Apple's manufacturing advances. Recently, however, a slight pall was cast over some of the advances. Apple reorganized once again—this time putting engineering in a group separate from manufacturing and marketing. It remains to be seen whether top Apple executives learned their lesson with the manufacturing mishaps of the Macintosh SE and II, and whether the separate manufacturing and engineering groups will cooperate effectively.

THE SOLDER PASTE RIVER
On the outside, a wave-solder machine looks like a large freezer box with a plastic top. But by peering inside, you can see the steamy river of solder paste. Heated to a torrid 237 degrees centigrade, the paste secures hand-placed parts and through-hole components to the board. The width of the solder paste river can be adjusted to either 8 inches or 12 inches to correspond with the size of the board. Boards then pass through another machine that degreases them. They are hand-inspected again and the edges that were left on—so that they could be handled by machines and people—are trimmed off. Apple's factories are very well ventilated; no chemical smells are noticeable.

DRAKE SOREY



Parts Is Parts

Not only must Apple worry about the number of components a Mac has and how easy they are to insert, the company must also make sure the components are top quality. When Apple first began producing Macs, compo-



DRAKE SOREY

FLEXIBLE MANUFACTURING
Completed boards make a trip to either the flexible manufacturing facility, where high-end Macintoshes are assembled, or to the building where compact Macs are assembled. The flexible manufacturing facility is designed to produce several styles of Mac. Because many of the high-end Mac's parts snap in, workstations in this factory do not need to hold a variety of tools, making a transition between product lines easier. On the morning this photo was taken, Macintosh Portables were being assembled. Workers in the foreground are putting finishing touches on the computers—snapping in keyboards, downloading system software and HyperCard (a 75-second procedure), and cleaning off the screen.



TAN WEE KHIANG

DELIVERING SUPPLIES

In the flexible manufacturing facility in Fremont, parts are distributed via conveyor belts. In the Singapore factory, however, five automatically guided vehicles deliver bulky materials. A Macintosh tracks inventory at each assembly station and notifies vehicles by radio when supplies are running low. The vehicles (which are programmed to play "Home on the Range" when moving) pick up and deliver incoming supplies. How do the vehicles know where to go? They count the number of dark and light floor tiles they pass over. Even more remarkably, the rubber-bumpered vehicles can sense objects in their paths, thus ensuring that no workers are hit.

nents often did not come in consistent sizes. "In the early days," says Michael Mikel, a robotics expert and onetime Apple engineer, "a big problem was standardization of components. We'd have to make changes to the Mac, things like enlarging the holes in the board, to allow for variations." But as tolerances become tighter on boards, Apple can no longer fudge specifications that way—it must have more control over the sizes of parts.

Although the specifications remain standard worldwide, each Apple factory buys its components from local suppliers. For Apple Computer Singapore, quality components are not an issue. At the Fremont factory, however, relationships with suppliers must constantly be monitored.

While most overseas consumer-manufacturer relationships are congenial, U.S. parts suppliers and manufacturers have traditionally fought each other. Parts suppliers don't want to invest additional time and money to meet manufacturers' special specifications; the manufacturers don't want to fully reveal their future plans. And both sides are pushed by investors to improve their short-term profits. "Auto-insertion machines made in the U.S. come with on-the-fly parts verification," says Matt Carter, the engineer who ran all operations in the original Fremont factory. "The Japanese machines don't. So when we were purchasing some equipment from a Japanese vendor we requested a verification facility. Their response was, 'Why? Don't you get good parts from your suppliers?' "

Apple devotes a lot of energy to overcoming the traditional supplier-manufacturer antagonism. Over the years,

the company has developed better-than-usual relationships with its vendors, partially because suppliers who accommodate Apple's requests receive a larger share of the company's business. Apple also spells out its quality requirements in supplier contracts and uses a supplier certification program so that some suppliers can ship parts directly to stock, bypassing the time-consuming test process.

Still, Fremont tests many more components than does Apple Computer Singapore, which tests fewer than 30 percent of its components. As long as the lack of cooperation between manufacturers and suppliers continues, Apple will have an uphill battle in Fremont.

Grappling with Robots

Ever since automation first appeared, social commentators have painted a vision of a useless work force displaced by the very machines that they created. Apple has a history of automating as much of the logic-board assembly as possible—not because the company is trying to eliminate workers, but because automation increases the Mac's reliability. Chips are becoming smaller—the smaller they get, the harder they are to place accurately and quickly by hand. Also, it becomes easier to break or bend leads.

Currently, about 5 percent of the Macintosh Portable's components are oddly enough shaped that they must be placed by hand. The Macintosh IIcx and IIci have an even better average, requiring only 1 percent of their components to be placed by hand. Still, Apple is readying six more robots to take over even more of the manual work.

Even if the board-assembly area were fully automated, people would still be needed to baby-sit the machines. The robots that place components on the boards sometimes have trouble picking up a recalcitrant component. Other times they misplace components, creating what looks like a logjam of chips on the board. Boards run into trouble in other places, too—for instance, getting stuck in the solder machine. When the software that runs these machines detects a problem, it sets off a red police-car light that beeps and flashes until an operator comes to the machine's rescue.

If the idea that automation will eliminate the need for workers is a myth, the idea that robots will lead to a lights-out factory—where machines work unattended in a dark room, stamping out identical products day after day—

ASSEMBLING A MACINTOSH SE

Unlike the newer Macs assembled in the flexible manufacturing facility, compact Macs have many parts that must be screwed together. For instance, the Macintosh SE chassis requires five screws and the case requires four; the Macintosh Portable doesn't contain any screws. To put all those screws into a Macintosh SE, workers must flip the chassis several times. Once this worker finishes driving the final screws into the chassis, she presses a button to send the computer down the line to other workers who add hard drives and EMI shielding.

DRAKE SORFY





TAN WEE KHIANG

TESTING A MONITOR
Now that everything but the outer case has been assembled, a worker adjusts the monitor's focus, brightness, and voltage levels, as well as the image area's height and width. The monitor is then glued down and the adjustments are rechecked. If the monitor fails to meet Apple's specifications, it is sent to a rework area to be fixed. A worker places the outer casing on Macs that pass the monitor test, and a machine presses the casing securely into place. A few screws are inserted and the Mac is ready for final testing.

is an even bigger myth. In Japan, where such factories exist to produce high-volume, low-cost items such as televisions and VCRs, many of the robots are simply machines that use actuators to do one thing reliably.

Although Apple designs some of these simple types of machines for use in its factories, many of Apple's robots are much more complex—and much more flexible. These machines consist of an arm mounted on a table. At the end of the arm is a gripping device, which can adapt to small changes in the size and shape of components. Operators can program robots to change tools so that instead of needing a different robot for each component—one for cams, one for VLSI chips, for example—the same robot can place a variety of parts on a board before sending it on to the next step.

Even better, operators can reprogram the robots to assemble new boards or to switch from one type of board to another as consumer demand changes. For instance, because all Apple boards come in one of two widths—8 inches or 12 inches—all products requiring the same size board can be manufactured on the same line. At Fremont, for example, where there are 12 assembly lines that can produce Macintosh logic boards, the number that are producing Macs versus the number that are producing other products (such as LaserWriter boards) varies from day to day, and even from shift to shift.



TAN WEE KHIANG

THE HIGHWAY
Apple relies heavily on conveyor belts to move supplies, boards, and Macs in all of its factories. Here fully housed Macs take a trip down Singapore's "highway" on their way to the burn-in towers (tall, metal shelves). Once there, Macs undergo at least 17 hours of tests designed to test, or burn in, all of a Mac's major components. Macs that pass are forwarded, again by conveyor belt, to a finishing area where workers test the display once again, to make sure that nothing changed during the burn-in process, and add final touches such as hand-cleaning the case. Then it's off to the packing area.

Lining Up for Change

Although flexibility is important at the board level, it becomes critical during the final product assembly. Not only must each assembly line be able to produce different products, but it must also be able to produce different configurations of those products quickly. On any given day, for instance, Apple may need to produce Macintosh Portables, Macintosh IIcx models with only a single floppy drive, and Macintosh IIcx's with a hard disk and a floppy drive.

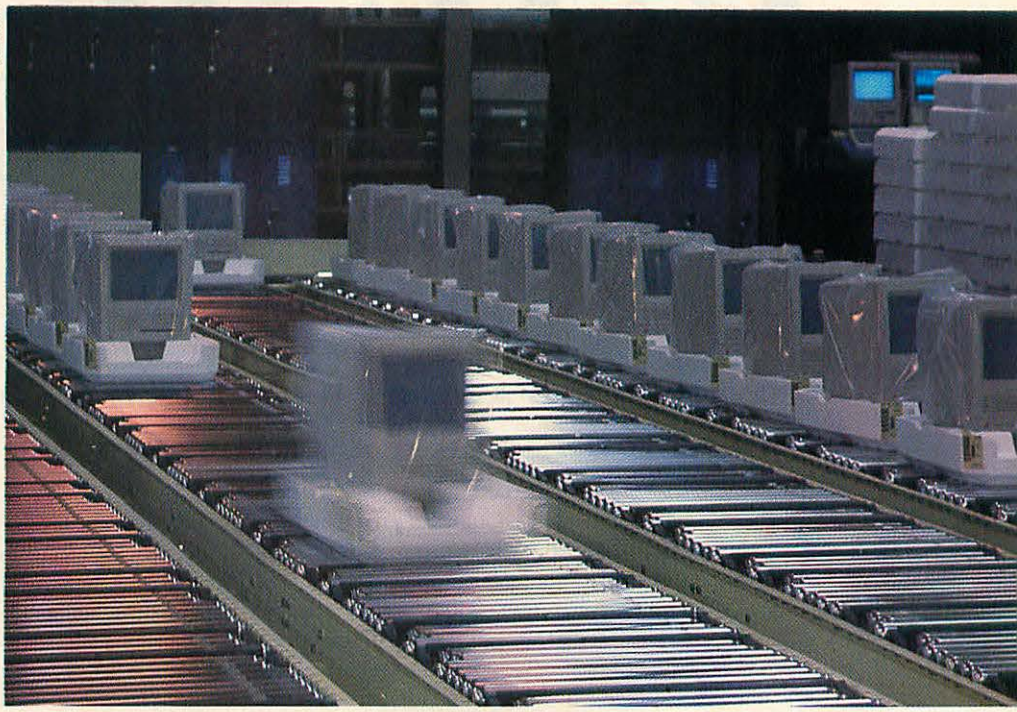
Changing the assembly lines to accommodate different machines or different configurations can take anywhere from a few minutes to a few hours. "Changing from Macs with 40MB hard disks to Macs with 80MB hard disks is almost a real-time event," says Mike Campi, director of Fremont manufacturing. "Other changes can be done between shifts. If a change requires retooling and fixtures, it can take from one hour to half a day." Fremont has become fast enough and flexible enough that it can make custom configurations for major customers without hampering its ability to meet normal product demand.

Once a Mac is configured, a scanner reads a bar code that has been attached to the Mac since step one and sends it down the proper conveyor lane—Macintosh SE/30s with a 40MB hard disk go into one lane, Macintosh SE/30s with an 80MB hard disk go into another. When enough Macs of

a given configuration are made to fill an order, those Macs are forwarded to a giant machine that automatically boxes them and spins shrink-wrap over the whole package. These boxes are loaded directly into a truck, ready for delivery.

This type of tracking and sorting process has to be exact, especially in the Cork factory, which must not only produce the standard Mac configurations but also produce each configuration in 17 languages. "Two years ago Apple shipped 350 configurations worldwide," says Fred Forsyth, vice-president of worldwide manufacturing at Apple. "This year [1989] Apple shipped 1200 configurations, and most of those are out of Cork."

DRAKE SOREY



ACCUMULATING MACS
As the Macs move down the line, a worker settles each one into its Styrofoam bottom and sends it on its way. The Macintosh in the background is running a custom HyperCard application that reads a bar-code label on the front of each finished Mac. Macs are sorted and sent down a specific lane of this accumulator. When a quota of, say, Macintosh SEs with hard disks is reached, a worker prompts the controlling Macintosh to send the finished computers to other workers who add the rest of the Styrofoam packaging, the manuals, and the cables. A giant machine boxes each Mac and spins shrink-wrap over the whole package. Macs are loaded directly into the trucks (or onto ships, in Singapore) that will take them from the factory to a store shelf.

Personal Attention

After spending several days in Apple's factories, watching Macs grow from bare boards to shrink-wrapped boxes, what remains most vivid is not the robots or the intricately designed system, for these will change yet again by the time I come back. Instead, it's the image of the people who make the factory work. Employees hand-inspect each board under a magnifying glass as it comes off the assembly line, they adjust monitors by hand, and they wipe off the Mac's plastic case before it is packed.

In spite of the criticism Apple deservedly receives for its short warranty, the company still cares about its products. That care is reflected in the way Apple treats the people who so directly affect the quality of the Mac. One of Apple's most successful experiments occurred during production of the Macintosh IIcx. A specially trained group of people nicknamed Team Avanti took responsibility for planning production schedules, worked with purchasing to solve supply problems, and gave their input on how easy the new design was to assemble.

Even outside Team Avanti, Apple is training its workers to interact directly with people other than their direct supervisors, frequently cutting through layers of management overhead. "Typically, if there is a problem with a part, the operator gets the industrial engineer who then goes to purchasing. Purchasing then goes to the vendor," says Campi. "In some cases now the operator goes directly to the vendor."

Apple long ago discovered that caring people are the driving force behind any innovation or advancement. The company's manufacturing arm continues to embody that core principle while, at the same time, moving ahead to implement clean product design, quality parts, automation, and manufacturing flexibility. It is the degree to which Apple is able to coordinate these concerns that will determine the company's impact during the coming decade. M

THE MULTIUSER DATABASE CHALLENGE

by Charles Seiter

CAN TODAY'S HIGH-END DATABASES PRODUCE USABLE APPLICATIONS?

Today's best-selling Mac databases are programmable, customizable, multiuser products with provision for remote data access. Since FoxBase+/Mac, 4th Dimension, Double Helix 3, and Omnis 5 represent the state of the database art in relational information systems, we put these programs through a real-life test. Most testing schemes, at *Macworld* and elsewhere, have only evaluated database programs for sorting-and-searching speed. While these are important, they're only a part of the picture. The databases reviewed here were either fast enough to begin with or greatly improved in their recent versions. The real test of a programmable relational database for the Macintosh is this: can a developer, working to a deadline, use it to create a real data-handling Mac application you'd be willing to use in running your business?

THE CHALLENGE

We rolled up our sleeves, considered our needs, and went to work. *Macworld* took the role of database client, creating specifications for an editorial database that we sent to ACIUS, Fox, Odesta, and Blyth. These vendors, in turn, recommended consultants who analyzed the specs and created the final applications. Each consultant had two weeks to meet the specifications using his or her specialty database. This tight deadline was intended to reveal which products have the best assortment of features to facilitate custom development.

As "The Database's Design" shows, a magazine like *Macworld* has information needs that can be served practically only by a relational system. These are typical tasks our editors require of a database:

- make a list, by model number and supplier, of all hard disks over 300MB in capacity, and find the contact person for each listed supplier
- make a list of experts on font technology
- generate the magazine's *Where to Buy* section from a list of articles

This editorial database example forced consultants to analyze a large-scale information-handling problem, decide on a database structure, and then implement the structure. The consultants were also required to create a convenient user interface with friendly data-entry screens and simple-to-operate report generators, so that even temporary workers could find useful information.

DOUBLE HELIX 3

Over the years, Double Helix has added features and speed. Still, the program remains the most idiosyncratic Macintosh database. Double Helix has a distinctive style in which you manipulate icons that stand for database elements such as fields and reports (see "The Icon Approach"). Nowhere in Double Helix do you type text commands; at the end of your efforts there's no program in the conventional sense. Most Double Helix programming is done with *tiles* that represent operations on fields—you stick one or more fields onto a tile and the tile then produces a result in another field or in a display. More complex tasks are handled by *sequences,* essentially macros composed of com-

RON CHAN


FIND
A
R
Q
1
ADDRESS
2
3
PHONE
4
NAME
5
FIND
R
?
3

mands chosen from a list. The profusion of Double Helix icons is bewildering to people familiar with text-oriented programming languages, but programming novices can go farther faster in Double Helix than in traditional systems.

Double Helix: Application Notes

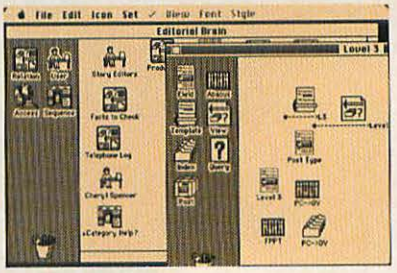
For the experienced developer, Double Helix allows rapid and unlimited customization of applications. It's common for Double Helix developers to coach database clients in making on-the-spot modifications to finished applications over the telephone—it's the only full-strength relational database for which we can make such a statement. The application delivered by Synergy Business Solutions featured every core capability demanded in the specifications and required no help from the developer to get started.

At the User code level (seen in "The Icon Approach"), it's possible to reassign, rename, add, or delete users, and to change data layouts and fields in data files. Most Double Helix applications are open in this way, which means that while they can be modified easily, they will never be as speedy as they could be in a database program such as FoxBase that compiles command files. Odesta has, however, improved the speed for some common commands, and Double Helix prompts users to index frequently used fields for greater search speed. At the price of additional storage space for indexes, searching performance on databases of 5000 to 10,000 records can be made unobtrusive.

Double Helix is also intrinsically multiuser. That is, applications developed in Double Helix can run under MultiUser Helix with no modification. We encountered no problems running Synergy's application on our network. Although we didn't have an opportunity to test it in this application, Double Helix on the Mac is compatible with a VAX/VMS version of the same program, and files can be read directly into Odesta's statistical program, DataDesk.

Double Helix: Details

The Double Helix application we received from Synergy used the Stories file as a core for data entry and retrieval (see "Complex Screens"). Synergy picked the Stories file since it is smaller than the Vendors or Products file; optimal Double Helix performance demands that the central file be as small as possible. The application also used extensive lists of subcategories in an attempt to make unindexed searches as fast as possible.



The Icon Approach

In Double Helix, fields are represented by one kind of icon, indexes by another, and layouts for data entry or reporting by another kind. A Double Helix developer performs calculations using abacus and tile icons, and chooses operations from a list to program sequences of commands. This unique approach is easy to learn and guarantees database reliability.



Complex Screens

The Double Helix screens for data entry and retrieval are the most complex and graphically detailed of any of the applications.



The HyperCard Feel

Omnis offers developers an easy way to program HyperCard-like screens. (Notice the row of navigation buttons at the bottom of the screen). Omnis includes commands for extracting data from HyperCard stacks.

The application ran with no problems on all types of Mac. The only bug encountered consisted of an occasional incorrect font size in a data entry window. Double Helix's coding style still allows you to do things unintentionally, such as set up incorrect links between files, but it won't let you do anything that will crash the final application.

The complex linked structure and fancy interface made the Double Helix application the hardest of the four for users to learn. For example, while it was easy to enter and retrieve all information associated with a particular story, it wasn't obvious at first how to do such simple searches as "Find all products from a given vendor." To solve this problem, we needed to install frequently used inquiries as buttons in the main Story screen; we didn't have time to do this for every possible request, but in practice each should take only a few hours to implement and test.

OMNIS 5

The first version of Omnis was a plain, albeit fast and reliable, alphanumeric database. The current implementation offers features that bring Omnis into the modern Mac world: an application generator; interfaces with buttons, arrows, and check boxes that activate underlying programs; and XCMDs for reading HyperCard data. Like FoxBase, Omnis has a relative that runs under both MS-DOS and OS/2, a situation that makes porting basic applications between platforms relatively easy.

Omnis programming differs from conventional programming in that you select its text-format commands from lists (an approach similar to Double Helix's sequences). Because of this, you can't compose a command sequence that will cross up the Omnis interpreter. This scheme works well because Omnis's command set is rich enough to allow you to accomplish most frequently required database chores with one or two commands. For instance, you can place radio buttons and browsing arrows in interface screens by selecting commands from lists. Omnis includes a bare-bones ap-

plication generator that produces working code based on a user-created outline of database requirements.

Omnis: Application Notes

Thanks to straightforward development tools and program foolproofing, the folks at Blyth & Associates (the consulting arm of Blyth Holdings) produced results quickly. The application arrived several days ahead of schedule and ran with no difficulties on all Macs from an SE to a IIci. Network installation caused no problems, and the Omnis application was one of the fastest when performing routine searches—not faint praise in the world of multiuser database applications.

We did have one complaint: since the easiest set of searching and browsing tools for programmers to implement do not have features for creating complex logical searches (product = hard disk AND price < $300), such searches weren't included in the application. On the other hand, Omnis's event manager enables you to do other complex tasks quickly, such as create an application that lets you have multiple windows open at once. Omnis developers report that they can revise an application nearly as fast as can Double Helix developers.

Omnis: Details

Upon extensive testing, we found the application's search behavior confusing—if a search couldn't find a match, it left you at a record that represented a partial match (occasionally a very far-fetched one) rather than reporting "No Match Found." The HyperCard-like interface required five or six mouse clicks and double-clicks for some operations rather than a single choice from a menu; the positive part of this interface restriction was that all users could operate the application without much help the first time they saw it (see "The HyperCard Feel").

The Omnis application demonstrates some nice touches that can, with use, become necessities. The program offers a handy function to find and optionally eliminate duplicate records. When you import data from a variety of sources, or if you have multiple users entering data on a network, filtering out duplicates can save space and time. The application also

THE PEOPLE BEHIND THE APPLICATIONS



JONATHAN LEVINE

GIL NUMEROFF, who developed the Double Helix application, is president of Synergy Business Solutions (516/935-9151) of Syosset, New York, a database consulting firm with a collection of Fortune 500 clients. He has been working with Helix since 1984 and says that the flexibility and easy modification of multiuser Double Helix databases make it a first choice for consulting work.

BOB DAVIS, who worked on the FoxBase+/Mac application, has 20 years of experience in database design on microcomputers and mainframes. He is director of Unicom's Software Development Group (401/785-3232) in Providence, Rhode Island, and has supervised the development of Unicom's popular Point Of Sale and dbMed/Mac databases for retailing and medical office management, respectively.



SETH RESNICK



CYNTHIA MOORE

MARCY SWENSON and RICHARD WOLPERT of After Hours Software (since 1986) in Van Nuys, California (818/783-5690), were selected to develop the 4th Dimension application. Both have worked for Apple and a variety of technology firms; Wolpert was one of the first 4D developers and wrote database software in 4D for both Apple and NBC.

STEVE WELLER and FERNANDO TEODORO of Blyth & Associates in Foster City, California (415/571-0222), the systems development subsidiary of Blyth Holdings, wrote the Omnis 5 application. Teodoro is director of technical services and Weller is a member of Blyth Software's technical staff; both have several years of experience in programming a variety of Macintosh and IBM PC databases.



ROBERT HOLMGREN

contained a mailing-label generator and a generous list of canned report formats. For example, it was simple to produce a printed report of all articles mentioning hard disks published between two dates—an option that proved even more flexible than the one we requested.

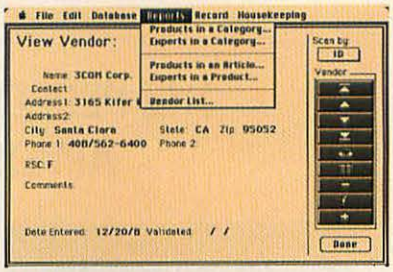
FOXBASE+/MAC 2.00

FoxBase+/Mac arrived as an austere, character-oriented database obviously translated directly from the IBM PC version. But FoxBase+ was fast—not a negligible point in view of the languid performance of other early Mac databases. Over the last two years Fox has added, piece by piece, the features needed to generate applications that sport a Macintosh interface (see "A Better Interface"). FoxBase+ features picture fields, interface-screen radio buttons, a report generator, a screen formatter with a MacDraw-style toolbox, and coding templates. The templates, although not as convenient as Omnis's application generator, at least give developers a framework for programming.

The set of templates and their associated control language, called FoxCode, are the key to FoxBase+/Mac applications. Templates and submodules, written in a Pascal-like syntax, generate screen tables that encapsulate screen design in a series of editable text statements and compiled templates. This system permits FoxBase+ to generate the program and format files that make up an executable FoxBase+/Mac program. This aspect of the FoxBase environment, while more typical of IBM PC than Macintosh practice, allows developers to translate program logic in a FoxBase application back and forth between a Mac and an MS-DOS or OS/2 machine. FoxBase+/Mac, like Omnis 5, would work well in offices that have Macs and PCs running their respective versions of the application on a network.

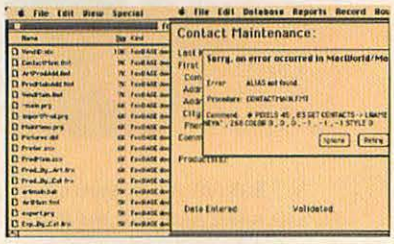
FoxBase+/Mac: Application Notes

The FoxBase+ files for our application consisted of approximately 600K of small program and format files, with a few large index files to accompany



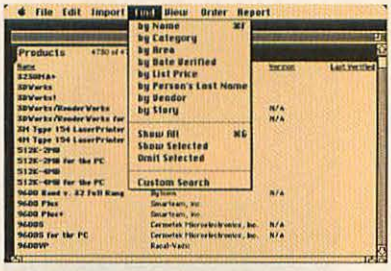
A Better Interface

Despite its IBM PC origins, FoxBase+/Mac now generates applications that look and work like standard Mac software.



The FoxBase+/Mac Format

A large FoxBase+/Mac application like ours typically consists of a collection of small files: compiled program bits (.prg files), screen formats (.fmt), and other types. If you misplace one of these files, you'll get an error message. This structure, however, allows developers to compile program elements, thus creating a fast application.



Straightforward and Easy

The 4th Dimension editorial application was a straightforward, generally list-based implementation that was nonetheless the easiest to use for complex functions.

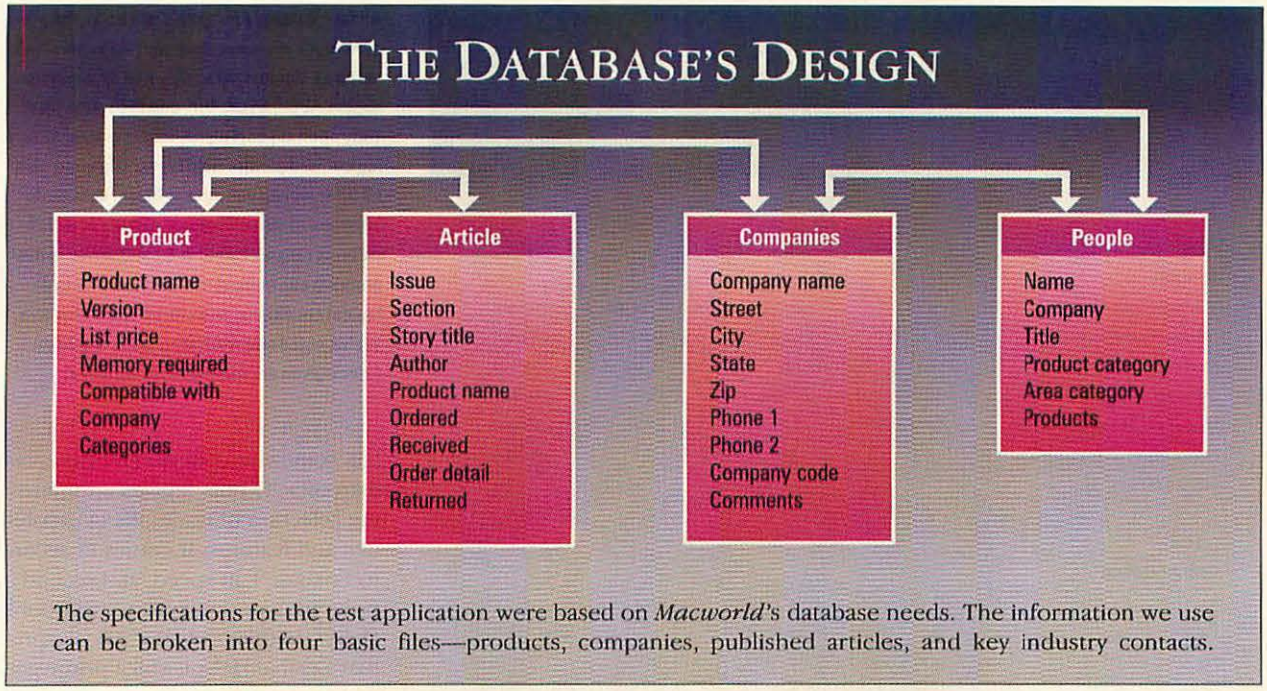
the data (see "The FoxBase+/Mac Format"). All these FoxBase+ elements are the pure-text equivalent of the icons for sequences, indexes, and so forth, in a Double Helix relation window. The interpreter designed to execute FoxBase+ program files entails much less overhead than the icon-programming interpreter in Double Helix, however. In FoxBase+, a Search command on a single database field invokes a piece of optimized code that calls up the index for the search field and matches the query to field data in less time than a screen refresh on a fast Mac. Part of the search speed and flexibility in this application derived from the addition of a keyword index, a 300K-plus behemoth with no counterpart in the other databases.

The disadvantage of the FoxBase+ approach is that it imposes most of the responsibility for program correctness on the programmer. Thus an unfinished run-time application in FoxBase+ can generate a variety of error messages when it is started. In Double Helix an unfinished application will simply lack intended features. Upon receiving *Macworld*'s specifications, Unicom assessed the project as requiring two to three months for a complete, optimized job.

FoxBase+/Mac: Details

In our application, FoxBase+ disabled MultiFinder; to get it running again, we had to call up a desk accessory that temporarily halted FoxBase+. Some functions produced an annoying number of error messages relating to missing formats; and the application exhibited a particularly graceless failure mode, with buggy features resulting in a "FoxBase has unexpectedly quit" message during searches. It is safe to say that you might see the same results if you gave a FoxBase+ developer two weeks in which to construct a complex database with interface amenities. Even using templates, FoxBase+ presents a large and complex line-by-line programming task, and this takes time. It's the price you pay for the speed you see in the final application.

Optimal use of FoxBase+ also calls for some understanding of database theory. For instance, our application contained such nonintuitive menu options as Rebuild Index. And while you can override the application's custom programming for direct data access, you must be familiar with the rudiments of FoxBase+'s command language. We found that on this partially finished application we could perform all the functions in our specification by using command-line operations; however, you wouldn't want to generate everyday reports this way.



The specifications for the test application were based on *Macworld*'s database needs. The information we use can be broken into four basic files—products, companies, published articles, and key industry contacts.

4TH DIMENSION 2.0.10

The launch of 4th Dimension (also known as 4D) was one of the biggest Mac software events at the time, as perhaps befits this large and complex product. In 4th Dimension it is possible to program nearly every function found in other Macintosh databases, and 4D offers other functions such as graphs (including sized-picture graphs) and an Oracle/SQL extension that no other database can match. For interface development, for example, besides the usual radio buttons and check boxes 4D has invisible buttons, scrollable zones, thermometers, and rulers, to name a few. The 4D screen editor for layout creation offers an array of patterns, measuring tools, and layering controls rivaling those of dedicated forms-generation programs. The 4D programming language has easily the richest command set of any Macintosh database, and the programming environment includes a symbolic debugger.

Not everyone feels immediately at home in such splendid surroundings. The first version of 4D required an amount of procedural programming that neophytes often found daunting, so ACIUS introduced an application template to guide beginners. Many of these features have been incorporated into 4D 2.0, which has a streamlined setup process and choices for creating menu items that let you manipulate records. While effective use of all the features of 4D requires diligent study, it's now possible, by following the tutorial and the Quick Start documentation, to create a simple, working relational database in one day.

4D: Application Notes

The original version of 4D would run quickly only if the programmer showed a lot of ingenuity when creating an application. The application delivered to *Macworld* by After Hours Software showed that ACIUS has both narrowed some of the performance gap between version 1.0 of 4D and FoxBase+/Mac, and shortened the time needed to produce a working database by adding a good selection of aids for developers. The application featured a relatively complex structure to accommodate the specification. With 4D it's easy to set up all the required types of files (products, vendors, articles, and so forth) and then link them graphically. Although in principle the drawing tools offered for layout creation can encourage lavish use of graphics in data entry and reporting layouts, the interface in the application we received was quite sedate (see "Straightforward and Easy"). The two-week time limit for creating this application, however, didn't give After Hours Software much of an opportunity to express 4D's artistic side.

One snag arose during testing. Because 4th Dimension 2.0.10 is designed to make optimal use of the Mac ROM and system files, it is quite possible that you will need to sanitize your Mac a bit to make 4D run properly. Some DAs and INITs cause 4D and 4D run-time applications to report system errors. ACIUS technical support is cheerful and knowledgeable about these problems and can see to it that your application will run, but you may find you have to live without certain familiar bits of software to use 4D. Once you have a set of machines cleaned up to ACIUS's standards, networking presents no difficulties.

4D: Details

4D is even more complex than FoxBase+. This implies, by the Iron Law of Programming, that a rush job will yield some unpleasantness: "I was expecting a numerical expression, ';' missing," and "This procedure does not exist" popped up in response to several menu-item choices. If you want

DATABASE DIFFERENCES

	4th Dimension 2.0.10	FoxBase+ /Mac 2.00	Omnis 5	Double Helix 3
Company	ACIUS	Fox Software	Blyth Software	Odesta Corporation
Price	$795	$695	$795	$595
GENERAL				
Maximum database size	4GB	unlimited	2.56MB per file	unlimited
Maximum records per file	16 million	1 billion	unlimited	unlimited
Maximum fields per file	511	128	255	unlimited
Maximum number of indexes	32,000	unlimited	32,000	unlimited
Maximum levels of passwords	32,000	0[1]	8	unlimited
Maximum number of open files	100	48	60	unlimited
FIELD TYPES				
Time	•		•	•
Subfile	•			
PROGRAMMING				
If	•	•	•	•
Case	•	•		•[2]
For	•	•		
While	•	•	•	
Repeat	•	•	•	
Arrays	•	•		
Number of commands	280	265	210	140
Financial functions	•			•
Statistics functions	•	•	•	•
External code supported	•	•	•	•
Command selection			•	•
Menu control	•	•	•	•
CONVENIENCE				
Label generator	•	•		
Graphs	•			
Welcome screen	•		•	•
Application generator	•		•	
Format drawing	•	•	•	•

[1] The application developer must program password control from basic input-checking commands.

[2] Double Helix offers a workaround for the Case statement.

All four database programs are powerful programmer's tools and they contain many similar features. For instance, they can all import or export ASCII, SYLK, DIF, and PICT data files. They each support alpha, text, numerical, date, logical, and picture field types. Likewise, they all offer lookup and unique fields, automatic insertion of default values, and the ability to define a range for field values. Queries in each program can consist of multiple fields and logical conditions, and can be case sensitive. We've noted major differences in this table. Prices given are for multiuser versions.

the power of 4D, you should plan on giving programmers time to use it.

Nonetheless, the 4D application led the pack in meeting our specifications and in ease-of-use. Double-clicking on a single-field item in a list opened the full data screen for the field. Clicking in a check box next to a date automatically updated the record to the current date. Menu items changed depending on the current screen context. Nearly every action prompted a response that you would expect. We also had no problem with relational linking of lists—as soon as an author was entered for a story, we could find the name connected to the products in the Products list. The 4D developers' environment has always been geared to developing applications that mesh with Mac users' intuition, and the *Macworld* application reflects that direction.

WHICH ONE FOR YOU?

If you need a working database by Friday morning and it's now Wednesday afternoon, or if you think your database requirements will be changing constantly, your best bet is Double Helix 3.0. If you are developing a large database with critical speed requirements and have the time to commission a serious programming project, your best bet is FoxBase+/Mac.

The other two databases evaluated fall somewhere between these two extremes. Omnis 5 gives an interesting selection of trade-offs in capabilities and features. It comes in second to FoxBase+ in speed, and second in programming convenience to Double Helix—in this context it's no surprise that Double Helix is still a prime generator of vertical applications. 4th Dimension includes a truly high-level computer language that still allows control of small details in data representation and display. Version 2.0.10 is the best attempt so far to deliver this power into the hands of mere mortals. It's worthwhile for beginners, but in order to exploit all of 4D's features you still need a programming background.

So which one would *Macworld* use? We'd go with the 4th Dimension application mainly because it has the most Macintosh-like interface and offers the most straightforward design. If we needed a larger database, we would choose FoxBase for its speed. If we expected to change the database every so often or if we were in a hurry to get an application running we would opt for Double Helix or Omnis. So don't get us wrong—we aren't saying that 4D is necessarily best suited for every project. It's simply that this time around, 4D provides strengths that match our main requirements well, and its weaknesses don't get in our way too much. ■

See *Where to Buy* for contact information.

***Charles Seiter's** current professional activities include modification of standard Mac databases for retrieval of nonalphanumeric data.*





ROLL OVER ROLODEX

The quest for the ultimate electronic Rolodex

BY DAVID POGUE

"No, NO! Not again!" cries Milton as he thrashes through his desk drawers, his glasses dangling crazily from his left ear. "If I can't find that slip of paper with my boss's car phone number, I'm finished!" Batting the mouse aside, he collapses onto his desktop in frustration.

Poor Milton. He's still condemned to losing phone numbers written in magazine margins, hunting for business cards





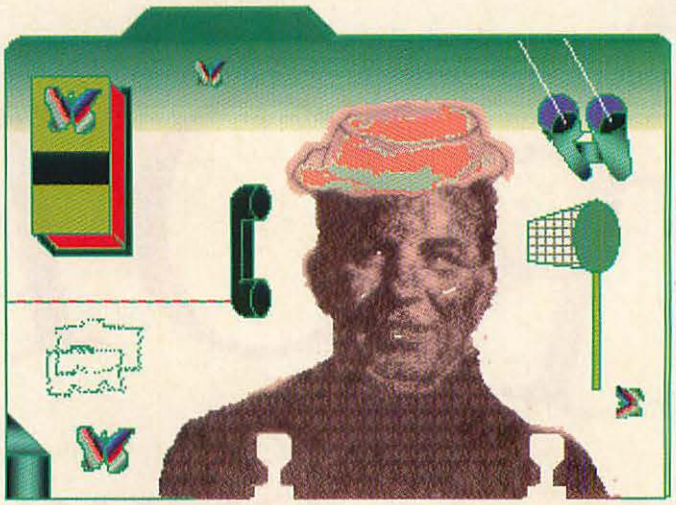
ILLUSTRATIONS BY JOHN HERSEY

people have handed him, and addressing hundreds of annual holiday cards by hand. Having demonstrated his wisdom by buying a computer—and his taste by buying a Mac—Milt still hasn't picked up on one of the greatest conveniences computers offer: an electronic Rolodex.

If only he'd consider the advantages. How gloriously efficient Milt would feel, accessing his name-and-address DA with the tap of a key. Returning home from a trade show with a stack of business cards, he'd know the glow of self-discipline as he filed them away electronically instead of chucking them into his paper-clip-and-stapler drawer. And making phone calls! Only an electronic address-book user can know the thrill of sitting back, feet resting on the desk, as the Mac chugs through a 31-digit credit-card dialing sequence automatically.

Milton doesn't yet realize that there's scarcely a better software value on the market. For little or even no money, he can vastly streamline his day-to-day operations. A Rolodex-type utility does more than bring order to thousands of names, numbers, and addresses; some of these programs are also perfect for jotting down and later instantly recalling phone-transaction records, notes about people you meet or call, or random brainstorms. Some stand ready to spew gorgeously formatted pages for Day-Timer or Filofax executive organizers, so you can take your numbers with you when you travel. A few Rolodex-type programs even print mailing labels, using the name and address but thoughtfully omitting telephone numbers, along with any comments you've added ("Met this guy on the golf course—incessant talker"). And, for the truly high-tech, it's even possible to dump the contents of a Rolodex program into a Wizard or Casio organizer.

Of course, no two people are alike. The perfect address-book program for Milton, bless his heart, may not be ideal for his boss. Fortunately, there are enough programs available to satisfy almost anyone with an I've-gotta-get-organized craving. Come and meet four Macintosh users, each with different address-book requirements. Perhaps you'll see something of yourself in one of their profiles.



THE FREE SPIRIT

Name: Jess Starton

Occupation: Naturalist, writer

Equipment: Mac Plus

Carries in backpack:

A Field Guide to North American Butterflies

Most prized computer accessory:

An "I ♥ Ozone" mouse pad

Most desired software trait:

Simplicity, low cost

Like millions of users, Jess has built his system around the basic Mac: black and white, quiet, and capable of being hauled to remote locations. He doesn't have a hard disk—two 800K floppy drives will do just fine, thank you—and he has a natural distaste for three-digit software prices.

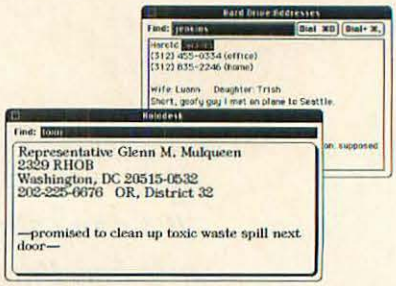
Sure, Jess could use HyperCard as an address book. It came with his Mac, and it even dials the phone. But it's a *program.* The last thing Jess wants to do in the middle of saving the earth is quit his word processor to hunt down a phone number. What Jess needs is his phone book in desk accessory form. Furthermore, he's a new Mac user. He wants to be able to find a number simply and quickly. One Shift-Option-Caps-Lock combination to memorize, and he's lost interest.

Lookup Quick

Fortunately, there's a perfect solution awaiting him, cleverly dubbed Rolodesk, which costs not a penny more than HyperCard. It's a DA, so it's handy. And it requires a minuscule 30K of disk space, so it works even on floppy-based Mac systems. Finally, it's unbelievably simple to use.

Rolodesk is built to act like a stack of index cards. Most people allocate one card to one name, address, and phone number, but Rolodesk is so free-form you can arrange things any way you want. There are no separate blanks for first name, last name, and so on; you just choose Insert Card from Rolodesk's solitary menu and type away (see "Random Access").

To find a number, you choose Rolodesk from the Apple menu. Rolodesk appears with the cursor waiting in the Find blank. All you do is type a few letters of your contact's name, and press Return; the card in



Random Access

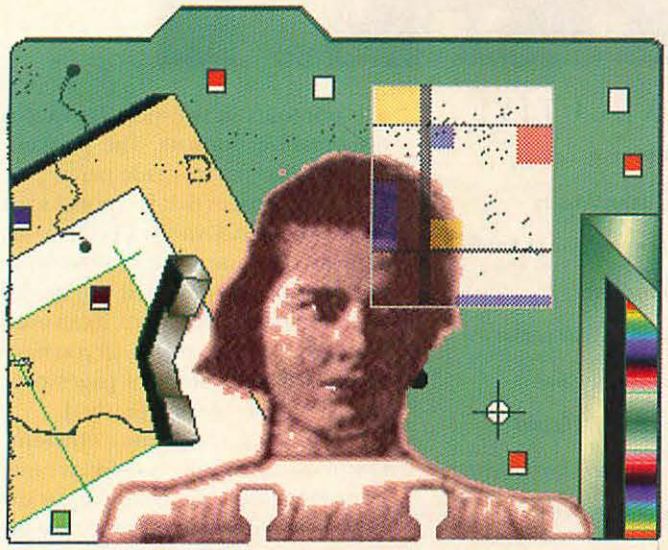
What makes the free Rolodesk (front) and the inexpensive QuickDex (rear) so fast is that contact information isn't filed away in separate fields for name, address, and so on. The price you pay for this speed is that you can't print mailing labels that contain only name and address. Except that QuickDex dials the phone and Rolodesk's window and fonts are adjustable, these two DAs are very similar.

question appears immediately. In fact, it's perfectly possible to begin pulling down the Apple menu as you say "Hold on a minute, Carol, I've got . . . ," and have the number on the screen by the time you're saying "that number right here." This fast, foolproof program is *freeware,* not shareware; no payment is requested. Incidentally, Rolodesk isn't just for novices—it's for anyone who'd like the quickest, friendliest, least-expensive online address book in the business.

The program with her name on it is QuickDex, the most popular Rolodex-type program of all. It works much like the public-domain Rolodesk in that it can find a name instantaneously, even amid thousands of listings. QuickDex's phone-dialing smarts, however, quadruple its usefulness.

When you click the Dial button (or press a keyboard equivalent), QuickDex actually reads the contents of the currently displayed card until it finds a phone number. It then dials the number over the modem, via the Mac's speaker (you have to hold the handset to the speaker to register the tones), or through an inexpensive Mac-to-phone connector called a HyperDialer. QuickDex even knows enough to dial 1 if the number is long distance.

People swear by QuickDex. It's so utterly simple, immediate, and reliable that it becomes for them a natural extension of working on the Mac.



THE FREE LANCE

Name: Anita Newpage

Occupation: Graphic designer

Equipment: SE/30, modem

Carries in purse: Art gum eraser

Most prized computer accessory:

Teak rolltop floppy-disk case

Most desired software traits:

Efficiency, clean design,

flexible phone dialing

As a modem owner, Anita's ready for one of the most useful, time-saving, and heady aspects of an electronic phone directory: automatic dialing. By hooking up her modem and phone to the same phone line, she can instruct her phone-book DA to dial a number for her. She picks up the receiver only when the dialing is complete.

White Pages

Anita would also do well to consider Address Book 2.0, a superbly executed, colorful desk accessory that's so highly polished you'd never guess that it's shareware. Address Book (not to be confused with Address Book Plus, a commercial program) is based on a white-pages metaphor: you see all your contacts in a neat, three-column alphabetical list. Double-click on a name—or use the Find command—to see the corresponding address-and-phone-number card, where there's one blank for the name, another for the full address, a third for your comments, and room enough for three phone numbers (see "Colorful White Pages").



Colorful White Pages

Address Book, a nifty shareware desk accessory, opens to a full page of name listings. Double-clicking on a name brings up the corresponding card, which has blanks for name, address, and notes, as well as three separately dialable phone numbers. This three-field arrangement gives you some of the flexibility of a free-form database, as well as the mailing-list export possibilities of a database with individual fields.

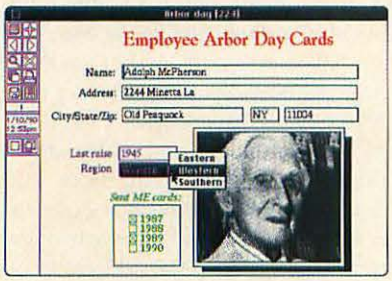
Though it takes only a moment longer to open than QuickDex, Address Book offers a feature QuickDex lacks: compatibility with long-distance credit cards. That is, if Anita needs to bill a call to her calling card, the program can automatically dial the 7-digit access number, pause, dial the number she's calling, and finally enter her 14-digit card code. At her request, Address Book even generates a text-file log of her long-distance calls. Complete with import and export functions, online help, a call timer, and one-criterion selections, this quick-as-a-wink minidatabase is worth many times its $10 price. And Address Book requires fewer keystrokes than any other Rolodex-type program to dial a number (see "Dialing Derby").

Data Alternative

If you'd rather trade Address Book's speed or QuickDex's simplicity for some additional flexibility, consider DAtabase. It's a reasonably complete database program under the Apple menu; it performs calculations, does elaborate searches and sorts, and even lets you paste in graphics (see "DAtabase Details"). You can build in data entry features such as check boxes and pop-up menus. And unlike QuickDex and Address Book, DAtabase supports multiple fonts, colors, and styles, and you can design its entry screen to look any way you like.

More to the point, however, DAtabase can be configured to operate exactly like QuickDex: that is, when you open the desk accessory, it immediately displays its Find What? screen, so that you can type a few letters of the target name and press Enter. And like Address Book, DAtabase can dial telephone numbers for you, including credit card sequences. In fact, you can bill each call to any one of five different credit card accounts, each with its own dialing scheme.

The latest version of DAtabase, 1.5, is slightly faster and much stabler than previous incarnations. It's still no match for the speed of QuickDex, however, whose all-Geneva font format makes it simpler and more immediate. On the other hand, DAtabase offers you the option of entering information in distinct *fields*—individual blanks for name, address, city, and so on. This means you can use DAtabase to print or export only certain pieces of information from each card—for example, the names and address but not the phone number, birthday, or kid's names.



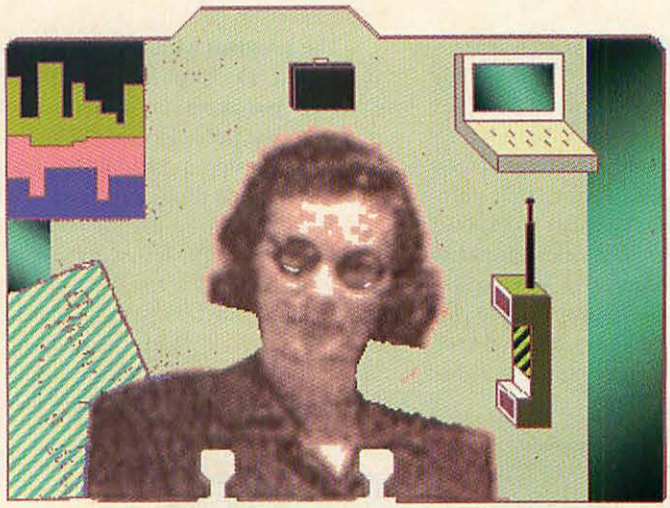
DAtabase Details

You design a DAtabase Rolodex to look however you want it. To help speed up data entry, you can create pop-up lists (as shown in the Region field above) or check boxes. You can even paste in a picture of each contact.



PIERRE YVES GOAVEC

DynoDex (left) and Address Book Plus printouts. DynoDex comes with convenient laser paper and a binder; you pay extra for both with Address Book Plus.



THE EXECUTIVE

Name: Helen Wheels

Occupation: Vice president of finance

Equipment:

Mac II, networked laser printer

Carries in briefcase:

U.S. News & World Report

Most prized computer equipment:

Mac Portable (on order)

Most desired software traits:

Speed, good printouts, data transportability

Because Helen works in an office, her Rolodex-type program will have to do more than display a phone number on cue—it will have to cooperate with the outside world. For example, Helen needs to use her address book as a mailing list. She also wants to share her address-book information with external databases, such as the client roster. And Helen uses a Filofax; therefore, she wants to be able to print her address book onto Filofax-size pages.

What Helen needs is a program that's more of a mailing-list manager than a quick-lookup Rolodex. A pair of new programs fit this bill. Both are designed to take the trial and error out of address-book printing.

Dynamic Solo

DynoDex is an address-book database that's been optimized for neat, attractive printouts in two popular executive-organizer formats. The program comes with custom-made paper perforated into pages that fit the included six-ring binder. DynoDex prints your address book neatly and attractively onto this paper (provided you have a laser printer). What's more, it can even print double-sided pages; all you have to do is flip the stack of pages over when the first sides are finished.

While it's quick and efficient, DynoDex can't print on Rolodex cards or mailing labels, or in any format except its two ready-to-go executive-organizer formats.

Plus, in Addition

DynoDex's primary competition is Address Book Plus (ABP), a mailing list–management application that displays your information on the screen exactly as it will be printed, even showing the outlines of the cards or pages you'll be printing on (see "Enter the Data"). It costs about half as much as DynoDex, but it's slower and doesn't print double-sided pages.

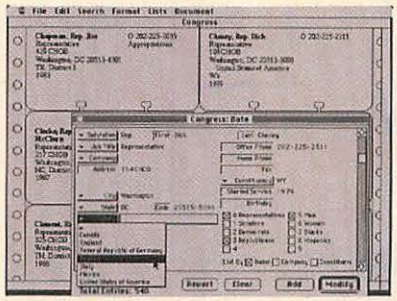
Nonetheless, ABP offers some unique advantages: it supports ImageWriter printing, its data-entry screen is more elegant than DynoDex's, and you can define your own label or card sizes. (You can buy paper or cards for either dot-matrix or laser printers, either from the publisher or from some computer-supply stores.) And used with its sister program, a mini–word processing desk accessory called Letter Writer Plus (sold separately), ABP constitutes a remarkably slick, effortless mail merge system.

Program Difficulties

While both DynoDex and Address Book Plus take the pain out of formatting, sorting, and organizing, they do so at the expense of flexibility. For example, DynoDex prints out names only in this form: Dan QUAYLE. Address Book Plus prints them out in this form: Quayle, Dan. There's no way to change either of these formats.

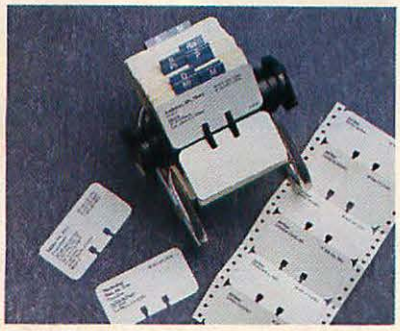
Furthermore, both are *programs*, not desk accessories. That means they are true Rolodex-type solutions—offering all the benefits of instant access—only for MultiFinder users. Address Book Plus's autodialing desk accessory doesn't qualify this package for true Rolodex status, since it doesn't let you add or modify names—it just dials them.

Both programs work well when importing or exporting data. You can select which fields you want to include and how you want fields delimited (by tabs or commas), and DynoDex lets you define the order in which you want them. Both programs dial the phone. If printing and transporting names and addresses is more important to you than the convenience of having them in desk accessory form, either program will serve you—or Helen Wheels—well.



Enter the Data

Address Book Plus features pop-up menus where you can store often-used contents for each field. For example, you can specify the Country for each congressional representative in this about-to-be-printed Rolodex by selecting the country from the pop-up list.



PIERRE-YVES GOAVEC

There's something twisted about using a Mac to print paper Rolodex cards. If you must exist from time to time in the physical plane, however, Address Book Plus makes this relatively painless. The pin-fed strips work equally well in a laser printer or Imagewriter.

ROLODEX RUNNERS-UP

Claimants of the Ultimate Rolodex mantle come in all guises; here are summaries of some of the other candidates. While none of these are as strong and efficient as the recommended programs, you may find one of them has a capability that's just what you need.

HyperCard 1.2

HyperCard probably doesn't need much introduction. It comes free with your Macintosh. HyperCard has built-in MacPaint-like tools so that you can make your address-book look any way you want it to. An address-book stack with automatic dialing is included with the program. But HyperCard lacks the convenience of a desk accessory, and its printing flexibility is notoriously poor. And—if you care about such things—HyperCard's window can't be resized, and it's not in color.

HyperDA 1.2

HyperDA 1.2 eliminates one of HyperCard's biggest drawbacks as an address-book utility: it's a desk accessory, not a program. Most HyperTalk commands work, so you can open and operate almost any HyperCard stack from HyperDA. And HyperDA even offers one feature HyperCard doesn't—the ability to put a stack in a resizable, movable window that you can position anywhere you want on the screen.

So how does HyperDA stack up as a Rolodex? It lets you find a name quickly, dial the phone, and edit the information on a card—but alas, you can't add or delete cards from within the DA.

Retriever 1.01

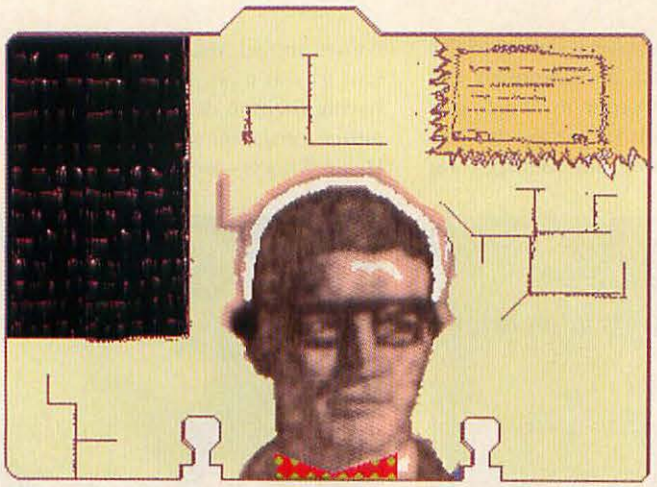
Retriever is an attractively designed, useful database desk accessory. Unlike the card-based programs, Retriever resembles a spreadsheet, with rows and columns. You can hide columns, select records by multiple criteria, and sort them. The whole affair is easy to use and attractively designed, and the manual is unusually good. But while Retriever is easy to use and immensely likable, it doesn't excel as a directory because of its file-size limit (32K per column) and because it doesn't dial.

SideKick 2.0

What a shame that SideKick, while still for sale, is no longer supported or maintained by its publisher, Borland. The MacDialer DA is one of the most full-featured dialers of any Rolodex-type program. It handles credit-card dialing sequences, calculates long-distance charges, and even records how much you're owed for your consulting time on the phone.

On the negative side, there's no Find command—you have to scroll through a list of your contacts, then click the one you're looking for. Another inconvenience: you can add only ten new names and numbers while you're using the desk accessory. You have to enter and exit the SideKick application before you can add more. And, according to Borland, the program doesn't run on a Mac IIci.

Even so, the MacDialer's time-tracking and billing features are nifty. If the program weren't all but an orphan on the market, it would be a prime contender.



THE ENTHUSIAST

Name: Howie Lovestahack

Occupation: Computer consultant

Equipment: Mac IIci with 8MB of memory, 9600-baud modem

Carries in briefcase: *Inside Macintosh*

Most prized computer accessory: Antique 1984 Mac case–opening wrench

Most desired software traits: Customizability

Howie lives in MultiFinder. Don't bother him with those trifling desk accessories—give him the real stuff. He doesn't care much about a program's simplicity; he wants flexibility.

For Howie, there are some more advanced possibilities. Panorama 1.5 comes to mind: a full-fledged, flat-file database program with lookup capability, whose graphics, searching, sorting, layout, and data-entry prowess puts dedicated address-book programs to shame.

"Jeez Louise," says Howie. "Panorama costs $400! Why would I want to use it as a Rolodex program?"

Panoramic Powers

There are as many answers as there are features exclusive to Panorama. For example, no other database program in Panorama's price range can dial the phone. Because the program comes complete with its own macro language, Howie can program it to perform any phone-dialing stunts he wants. Depending on which programmable on-screen button he clicks, for example, he can specify whether he wants to dial a client's home or work number, which credit card he wants the call billed to, and so on. Or how about this unusual touch: Panorama's Flash Sound feature lets you create a digitized voice that reads the phone number to you out loud. Such hypercustomization requires that Howie learn to work with Panorama's macro language, of course, and put some time into polishing his work. But for the software control freak—or for Howie's clients—the possibilities are endless.

Furthermore, one of Panorama's best aspects is its talent for graphics. Howie can design his own printout formats—one for Rolodex cards, one for Filofax, one for envelopes—all accessing the same set of names and addresses. He'll discover, of course, that creating the appropriate forms manually is more tedious than it is with ready-to-go Rolodex programs. But the advantage is that his printed mailing lists and address books look exactly as he wants them to, complete with his logo, a header at the top of each page, and so on—touches that would be impossible in a dedicated program.

Of course, the final justification for

ROLODEX ROLL CALL

	Address Book 2.0	Address Book Plus 1.0	DAtabase 1.5	DynoDex 1.1	HyperCard 1.2	HyperDA 1.2
Company	Shareware	Power Up Software	Preferred Publishers	Portfolio Systems	Apple Computer	Symmetry
Price	$10	$89.95*	$129.95	$149.95	free†	$89.95
Desk accessory	yes	dialer only	yes	no	no	yes
Application	yes	yes	for design	yes	yes	no
Dialing	yes	yes	yes	yes	yes	yes
Credit card dialing	yes	no	yes	no	‡	‡
Color selection/font selection	yes/no	no/yes	yes/yes	no/yes	no/yes	no/no§
Individual fields	yes (3)	yes	optional	yes	optional	optional
Sorting	yes	yes	yes	yes	yes	no
Printing (labels/organizer pages)	no/no	yes/yes	no/no	no/yes	no/no	no/no
Import/export	yes#/yes	yes/yes	yes#/yes	yes/yes	‖	§
Seconds to open 540-name file	4	15	4	7	4	6

**$129.95 package also includes black leather binder.*

†If HyperCard didn't come with your Mac, you can buy it for $49.

‡Can be accomplished through programming.

§Only from within HyperCard.

‖Sorting by last name not available.

#Using included utility application.

buying the relatively expensive Panorama as a Rolodex is that you don't just get a Rolodex; you get a terrific database in the bargain. You don't have to worry about importing or exporting new names and addresses to your database; they're already *in* the database. Howie can store inventory or billing information right alongside the client roster—or, using Panorama's pseudorelational "lookup" links, this information can be stored in a different file.

For power-user Howie, that's a blessing indeed. His supercustomized Panorama Rolodex not only dials his consulting clients, it also calculates the duration of each call, computes his consulting charges for the phone time, stores this information in a billing file, and generates an invoice that's ready to mail to the client. (And if Howie didn't have the time to design this interactive Rolodex and billing system himself, he could have purchased it directly from Panorama's publisher in the form of a $15 ready-to-go template form.)

Looking Up

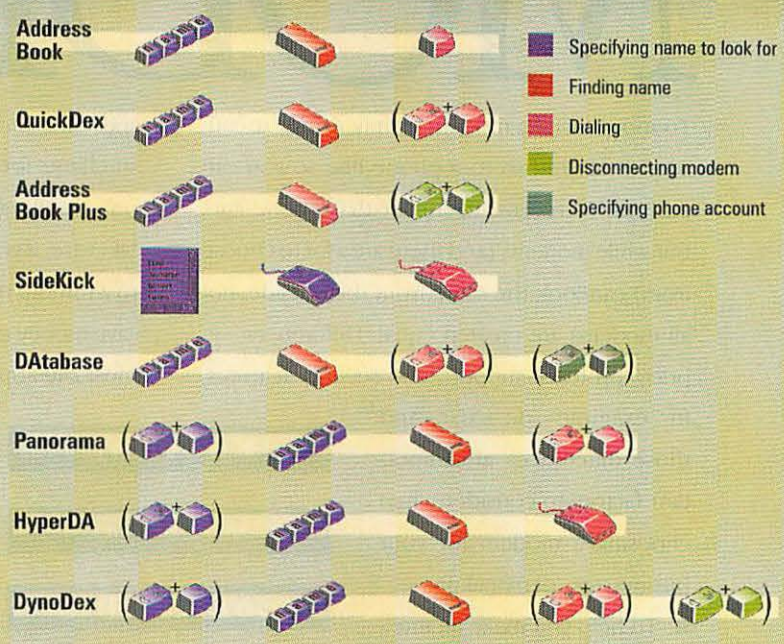
The good news for you is that all of these recommended programs are carefully executed, powerful, and generally easy to use. With the exception of Panorama, they don't cost much, either. The bad news is that unless your names and numbers are already in electronic form, someone's still going to have to endure the drudgery of typing them all into the Mac. (Panorama, DynoDex, DAtabase, and Address Book Plus offer some shortcuts for data entry, such as automatic capitalization—but that's not much consolation if you've got 500 names in your real-life Rolodex.)

At least the effort will be worth it. Not only will you never again misdial a long-distance number, but with your entire world of contacts only a click away, you'll feel immensely organized and efficient. At last you can clear your desk of business cards, scraps of paper, and maybe—just maybe—even your Rolodex. Ⓜ

See *Where to Buy* for contact information.

Dialing Derby

How many steps does it take to find and dial a phone number? This chart tells the story for each of the programs under review. Address Book takes the convenience crown, closely followed by QuickDex and Address Book Plus. The fewer times you have to use the mouse, the more efficient the process.



Panorama 1.5	QuickDex 1.4a	Retriever 1.01	Rolodesk 3.3	SideKick with MacDialer
ProVue	Casady & Greene	Exodus Software	Freeware	Borland
$395	$60	$89.95	freeware	$99.95
no	yes	yes	yes	yes
yes	no	no	no	optional
yes	yes	no	no	yes
*	no	no	no	yes
yes/yes	no/no	no/no	no/no	no/no
optional	no	yes	no	yes
yes	no	yes	no	yes‡‡
yes/yes	no/no	no/no	no/no	yes/no
yes/yes	yes**/no	yes/yes	yes**/no	yes#/yes
6	2	††	4	2

***Using special control characters in the text file to be imported.*

†† Could not completely open file, due to file-size limit.

David Pogue, *a* Macworld *contributing editor, doubles as an orchestrator and conductor. He wishes someone would please enter the Manhattan phone book into QuickDex.*

Choosing a 2400-bps MODEM

To most users, a modem simply works: it connects a Macintosh to a phone line so you can transmit or receive data over that phone line. But while modems (and there are a lot to choose from) can look the same from the outside, not all modems are created equal. Differences—in price, protocol support, and security features, for example—do exist. And those differences are important factors to consider when choosing a modem for your business or personal use.

■ To help you make an intelligent buying decision, I'll discuss many of the features available for modems and explain in practical terms what those features mean to you. ■ Although there are plenty of 300- and 1200-bits-per-second (bps) modems still around, 2400-bps modems are rapidly becoming the standard for Mac telecommunications—just as 300 bps and 1200 bps were standards in their days. Because of this, I decided to concentrate on 2400-bps modems. ■ Most information services (CompuServe, GEnie, America Online, and so on) offer 2400-bps dial-up lines that let you spend less time online than you would at slower speeds. Even though some services do impose a surcharge for operating at 2400 bps, saving time online still translates directly into saving dollars. Likewise, if you use the Mac to send data directly to a remote minicomputer or mainframe, you'll save money on long-distance calls. ■ Because most 2400-bps modems can also send and transmit information at 1200 bps and 300 bps, owning a 2400-bps modem lets you communicate at slower speeds should the need arise. Depending on the manufacturer, a 2400-bps modem may cost only a little more than a 1200-bps modem with comparable features. In fact, because of the small price differential, some manufacturers are beginning to phase out their 1200-bps modems altogether. ■ Let's start with the basics. There are two types of modems, external and internal. External modems sit outside the Mac and are connected to it with a cable. Internal modems are add-in boards that must be installed inside the Mac. ■ For owners of the Plus and earlier Mac models, choosing between external and internal is simple. Because those Macs have no internal add-in slots, they work only

Knowing what to look for in a 2400-bps modem makes getting online easier

by Steven Schwartz



The most popular way to telecommunicate is with an external 2400-bps modem. Even though the median cost of a 2400-bps modem is about $450, prices actually range from $100 to $3000.

PHOTOS BY HENRIK KAM

with external modems. The Mac SE, SE/30, and Mac II family can support either type of modem.

Internal and external modems each have advantages and disadvantages. Certainly an internal modem won't take up room on your desk, nor will it require a serial cable or an external power supply, the way an external modem does. An internal also leaves the external serial port free to connect to another device. Xecom takes this a step further by adding several additional serial ports to its internal modem add-in boards.

Internal modem installation—particularly in an SE—can be tricky. If the SE is new, you'll have to let a dealer do the installation unless you wish to risk voiding the SE's warranty. Remember also that an SE or SE/30 has only one slot for add-in boards, and, like all boards, an internal modem does represent a drain on the Mac's power supply. Another disadvantage of an internal modem is that it doesn't have any indicator lights, which makes troubleshooting more difficult.

External modems, on the other hand, can be easily moved between computers, Macs or IBM PCs, if necessary. Many manufacturers known primarily for IBM PC products make external modems that work fine with a Mac, as long as you have the right cable.

Speed Standards

The word *modem* actually comes from MOdulate/DEModulate, which is what modems do when they transmit or receive information. To send data, a modem transforms, or *modulates,* digital data from the Mac into an analog signal that can be transmitted over phone lines. That analog signal is called the *carrier wave.* To represent bits of digital information, the modem must correspondingly change either the amplitude or phase of the carrier wave while transmitting information. When a modem receives information, it *demodulates* the carrier wave back into digital data.

To make sure modems from one manufacturer can send or receive data from another manufacturer's modem, vendors have established *modulation standards.* The standards a modem supports dictate which other modems it can talk to. For 2400-bps communications, the standards to look for are V.22 and V.22bis, which come from the European standards group Consultative Committee on International Telegraph and Telephone (CCITT).

In addition to V.22 and V.22bis, a modem must support modulation standards for slower speeds. It's difficult (and expensive) to work online interactively at 2400 bps: incoming data often scrolls off the screen too quickly to be read. In such situations, working at 1200 bps or even 300 bps may be preferable. Some small bulletin board services (BBS) may only support 1200-bps or 300-bps dial-in speeds.

Modulation standards ensure that one modem can talk to another, regardless of their manufacturers

AT&T's Bell 103 and 212/212A are the standards for 300-bps and 1200-bps modulation, respectively. Many modems that support lower speeds can also transparently negotiate a highest common denominator with the modem on the other end of the line. That negotiation feature ensures that you always work at the highest speed the two modems share and that current line conditions allow.

Error Control

To help ensure that data is transmitted error-free and as rapidly as possible, many manufacturers implement error-control and data-compression routines in the read-only memory (ROM) of the modem. There are two popular schemes for built-in error detection and control: the Microcom Networking Protocol (MNP), developed by Microcom, and the CCITT's V.42.

MNP is a whole suite of protocols that are divided into *classes.* Error-checking is usually handled by Classes 2 through 4. A glance at the modem chart reveals that MNP error control is the current de facto standard of most U.S. modem manufacturers.

But things are changing. In October 1988, CCITT introduced the V.42 error-control standard, which supports two protocols: Link Access Protocol Modem (LAP-M) and MNP classes 2–4. V.42 includes MNP to support the large existing base of modems that use MNP's error-control routines. V.42-compatible modems implement either one protocol or the other, usually MNP. V.42-compliant modems support both MNP and LAP/M.

The advantage of a V.42-compliant modem is that its error-control features work with 2400-bps modems that support either MNP or LAP-M. Since future protocols will be based on LAP-M, having a V.42-compliant modem keeps you one step farther away from obsolescence. V.42-compliant modems are just beginning to be available, since the V.42 standard itself is relatively new. You should check with the manufacturer for a modem's level of adherence to the V.42 standard, and for the possibility of upgrading to V.42.

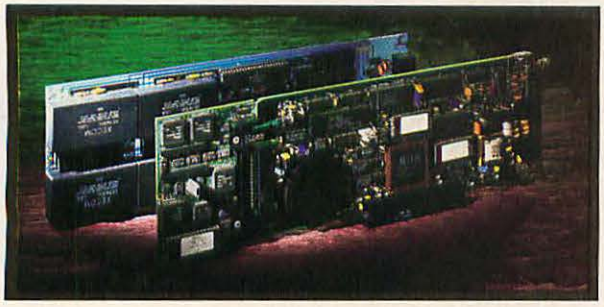
One advantage of having a modem with built-in error control is that, unlike software error-checking protocols, built-in protocols require no action from the user. When two modems connect, they determine the highest level of error control available within both units and make use of it automatically. This means that even non-protocol transfers (text files and data entered from the keyboard) will be handled without error.

You'll note in "Fistful of Modems" that many modems do not include error control. Error-control protocols (Xmodem and Kermit, for example) are options within all but the most elementary telecommunications software programs.

Data Compression

Data-compression routines are being incorporated into modems by manu-

facturers, and you will find a variety of schemes available. The most widely supported compression standard is MNP Class 5; Hayes Microcomputer Products also has its own protocol, Hayes Adaptive Data Compression. In September 1989, CCITT approved its own standard: V.42bis.



Internal modems like these from Hayes and Xecom won't take up room on your desk—just a slot in your Mac.

When properly implemented, either MNP Class 5 or Hayes Adaptive Data Compression can effectively double a modem's data *throughput.* You get essentially 4800-bps performance from a 2400-bps modem. V.42bis, on the other hand, claims a 4-to-1 improvement in throughput. Currently, only a handful of manufacturers—Hayes, Jasmine, Multi-Tech Systems, and Supra—offer V.42bis.

Like error control, compression capabilities are available in software—for example, StuffIt. The difference between hardware support (in a modem) and software support is that data compression doesn't occur on the fly with software. You have to compress files with StuffIt before transmission, which is less convenient.

Who needs built-in data compression or error control? If you routinely transmit huge files, built-in data compression may save you thousands of dollars of telephone time annually. If you send and receive critical information (budgets, vital documents, and so on) that must be error-free, you're an excellent candidate for built-in error control.

On the other hand, if your main telecommunications activities center around the popular information services or swapping a few files with friends, you probably don't need built-in error control and data compression.

Hayes Compatibility

Much to the chagrin of the other manufacturers, Hayes compatibility has become a sought-after and frequently touted standard in the modem business. Essentially, if a modem is Hayes-compatible, when it receives an AT command (a command that's preceded by the letters *AT,* which gets the modem's attention) it acts the same way that a Hayes modem would. Some manufacturers, in order to support advanced features in their modems, have extended the command set by adding special-purpose commands.

All manufacturers listed in "Fistful of Modems" claim their modems meet basic Hayes compatibility requirements—enough for calling information services and BBSs. But should you plan on using a modem for sophisticated telecommunications tasks—such as dialing remotely into an AppleTalk network—it will pay to check a modem's compatibility further. In such cases, go with the most compatible, reliable modem you can afford. And depending on the communications software you select, even command-set compatibility may not be enough. Hayes Smartcom II software, for instance, is designed to work only with real Hayes modems.

Making Life Easier

In addition to the important features above, you should also consider comfort factors when choosing a modem—the little unessential things that make an important difference.

Imagine using a touch-tone phone that transmits the tones for the numbers you press without letting you hear them. Yes, it might work, but how many wrong numbers would you dial because you weren't really sure that you pressed the 7? Using a modem without a speaker is a lot like that. With a built-in speaker or a modem that uses the Mac's speaker, if there's trouble on the line, a busy signal, or —God forbid!—you connect with a human rather than a computer, you'll immediately know what's happening. Consider a speaker a necessity.

Indicator lights that show you what a modem is doing can be a big help, especially if problems arise. For example, many modems have lights that indicate whether a modem is set to answer mode or not, and whether or not a carrier wave is present. Personally, I've always been willing to settle for a single light indicating whether the modem is on or off. Good communications software can often provide the same sort of feedback.

Intelligent Dialing Most of the modems in the chart have autodial and autoanswer capabilities. These features enable you to dial numbers from the keyboard without using a telephone handset, and to have the modem answer incoming calls automati-

FAX MODEMS

Not all modems are just modems. Over a dozen listed in the chart are fax modems—modems that can do double duty as 2400-bps modems and as high-speed, Mac-controlled fax units. With them, you can send and (if you don't mind leaving the Mac on all the time) receive faxes from either stand-alone fax machines or other fax modems. Be aware, however, that received faxes take up a lot of hard disk space; they can also take a long time to print.

If you want primarily the ability to send Mac documents as faxes—not receive faxes—take a look at *send-only* fax modems, like Zoom Telephonics' MX2400S with Sendfax. According to Zoom, adding send-only fax capabilities to many modems increases their cost by only $50 or so. A send-only fax modem may be an excellent solution for users who don't want to dedicate a phone line and a Mac to fax activities.

FISTFUL OF MODEMS

Company	Modem Name	Price	Type*	Supports Fax	Modem Modulation Standards	Error Control Protocols
Abaton	InterFax 24/96	$595	E	•	103, 212, 212A, V.22, V.22bis	V.42
Anchor Automation	Anchor 24E	$219	E		103, 212, 212A, V.21, V.22bis	none
	Anchor 24E Mac-Pac	$239	E		103, 212, 212A, V.21, V.22bis	none
	Anchor 24E5 Mac-Pac	$399	E		103, 212, 212A, V.21, V.22bis	MNP
	Anchor 24E5 Secure	$499	E		103, 212, 212A, V.21, V.22bis	MNP
Apple Computer	Apple Modem 2400	$499	E		103, 212A, V.22, V.22bis	MNP
	Macintosh Portable	$499	I		103, 212A, V.22, V.22bis	none
	Data Modem 2400					
Applied Engineering	DataLink Express	$249	E	•	103, 212, 212A, V.21, V.22, V.22bis	MNP
	DataLink Mac	$349	I	•	103, 212, 212A, V.21, V.22, V.22bis	MNP
	DataLink Mac Portable	$399	I	•	103, 212, 212A, V.21, V.22, V.22bis	MNP
Beverly Hills Computer	Beverly Hills 2400 External	$129	E		103, 212A, V.22, V.22bis	none
	Beverly Hills 2400 External	$198	E		103, 212A, V.22, V.22bis	MNP
	MNP					
	Beverly Hills 2400 Internal	$399	I		103, 212A, V.22, V.22bis	none
Bizcomp Corporation	IntelliModem 2400, Model	$499	E		103, 212, 212A, V.22, V.22bis	MNP
	4124					
Bytcom	24/12 Sparta	$119.95	E		103, 212, 212A, V.22, V.22bis	none
Circuit Research	FlexFax	$895	E		103, 212, 212A, V.22, V.22bis	none
Codex Corporation	Codex 2234	$495	E		103, 212A, V.22, V.22bis	MNP
	Codex 2235	TBA[1]	E		103, 212A, V.22, V.22bis	MNP
Computer Friends	LightFax 9624	$499	E	•	103, 212A, V.21, V.22, V.22bis, V.29	none
	LightSpeed 2400	$149	E		103, 212A, V.22, V.22bis	none
CXR/Anderson Jacobson	2412-AD3H	$695	E		103, 212A, V.22, V.22bis	none
	2412-SCI	$695	E		103, 212A, V.22, V.22bis	MNP
	2412-STH	$495	E		103, 212A, V.22, V.22bis	none
EMAC	EMAC MD2400	$349	E		103, 212, 212A, V.22, V.22bis	V.42
E-Tech Research	Bulletmodem E2400M	$395	E		103, 212, 212A, V.22, V.22bis	MNP
Gandalf Technologies	Access Series 24A	$350	E		103, 212, 212A, V.21, V.22, V.22bis	none
	Access Series 24EC	$495	E		103, 212, 212A, V.21, V.22, V.22bis	MNP
General DataComm	DeskTop 224	$375	E		103, 212, 212A, V.21, V.22, V.22bis	none
	DeskTop 224E	$495	E		103, 212, 212A, V.21, V.22, V.22bis	V.42
	DeskTop 596	$1075	E		103, 212, 212A, V.21, V.22, V.22bis, V.32	V.42
GVC Technologies	FM4824	$246	E	•	103, 212A, V.21, V.22, V.22bis	none
	FMM4824	$294	E	•	103, 212A, V.21, V.22, V.22bis	none
	SM24	$206	E		103, 212A, V.22, V.22bis	none
	SM24M	$298	E		103, 212A, V.22, V.22bis	MNP
Hayes Microcomputer	Smartmodem 2400	$499	E		103, 212A, V.22, V.22bis	none
Products						
	Smartmodem 2400M[2]	$499	I		103, 212A, V.22, V.22bis	none
	V-series Smartmodem	$699	I		103, 212A, V.22, V.22bis	LAP, V.42
	2400M					
	V-series Smartmodem	$649	E		103, 212A, V.22, V.22bis	LAP, V.42
	2400 V.42					
	V-series Smartmodem	$649	E		103, 212A, V.22, V.22bis	LAP, V.42
	2400 X.25[3]					
Intel Personal Computer	2400EX	$299	E		103, 212, V.21, V.22, V.22bis	none
Enhancement						
	2400EX MNP	$349	E		103, 212, V.21, V.22, V.22bis	MNP
Jasmine Technologies	TalkBac	$199	E		103, 212, 212A, V.22, V.22bis	V.42
La Cie	2400 Mac External Modem	$169.95	E		103, 212A, V.22, V.22bis	none
	2400 Mac II Internal Modem	$299.95	I		103, 212A, V.22, V.22bis	MNP
	2400 Mac Portable Data/	$249.95	I	•	103, 212A, V.22, V.22bis	none
	Fax Modem					
MacProducts USA	MagicModem 2400	$99	E		103, 212, 212A, V.22, V.22bis	none
	MagicModem 2400	$119	E		103, 212, 212A, V.22, V.22bis	none
	MacPack					
MacZone	SmartLink 2400M (MNP5)	$245	E		103, 212, 212A, V.22, V.22bis	MNP

This chart includes a broad range of currently available modems, but it is not a complete list of all 2400-bps modems or modem manufacturers. According to the manufacturers, each modem included in this chart is Mac-compatible. All features claimed are implemented in the modem hardware, not within software.

Compression Protocols	Flow Control	Voice-to-Data Switching	Command Set	Security Support	Interface	Warranty
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	1 year
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	5 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	5 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	5 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	5 years
none	none		Hayes AT		8-pin DIN	90 days
none	none		subset of Hayes AT		Mac Portable board	90 days
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	5 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		NuBus board	5 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		Mac Portable board	5 years
none	none	•	Hayes AT		25-pin RS-232-C	1 year
none	none	•	Hayes AT		25-pin RS-232-C	1 year
none	none	•	Hayes AT		NuBus board	1 year
none	RTS/CTS (optional), XON/XOFF	•	Extended Hayes AT		25-pin RS-232-C	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT	•	8-pin mini-DIN	2 years
none	DTR/CTS, RTS/CTS, XON/XOFF	•	Hayes AT, V.25bis		25-pin RS-232D	1 year
MNP	DTR/CTS, RTS/CTS, XON/XOFF	•	Hayes AT, V.25bis		25-pin RS-232D	1 year
none	RTS/CTS, XON/XOFF		Hayes AT		female DB-25	1 year
none	RTS/CTS, XON/XOFF	•	Hayes AT		female DB-25	2 years
none	RTS/CTS	•	Hayes AT	•	25-pin RS-232C	1 year
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	1 year
none	RTS/CTS	•	Hayes AT		25-pin RS-232C	1 year
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	1 year
MNP	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232D	1 year
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232D	1 year
none	none		Hayes AT		25-pin RS-232D	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT, V.25bis		25-pin RS-232D	1 year
MNP	RTS/CTS, XON/XOFF	•	Hayes AT, V.25bis		25-pin RS-232D	1 year
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF	•	Extended Hayes AT		25-pin RS-232C	2 years
MNP	RTS/CTS, XON/XOFF	•	Extended Hayes AT		25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
MNP, Hayes, V.42bis	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
MNP, Hayes, V.42bis	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
Hayes	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
none	XON/XOFF	•	Extended Hayes AT		25-pin RS-232C	5 years
MNP	RTS/CTS, XON/XOFF	•	Extended Hayes AT, MNP		25-pin RS-232C	5 years
V.42bis	XON/XOFF		Hayes AT	•	8-pin DIN	2 years
none	none		Hayes AT		25-pin RS-232C	1 year
MNP	RTS/CTS, XON/XOFF		Hayes AT		NuBus board	1 year
none	none		Hayes AT		Mac Portable board	1 year
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
none	XON/XOFF		Hayes AT		25-pin RS-232C	2 years

[] E = external; I = internal.*

[1] Allows modem sharing over AppleTalk network.

[2] Cellular telephone option available.

[3] To be announced.

[||] Provides four devices (either modems or fax modems) on board.

FISTFUL OF MODEMS (continued)

Company	Modem Name	Price	Type*	Supports Fax	Modem Modulation Standards	Error-Control Protocols
	SmartLink 2400S	$139	E		103, 212, 212A, V.22, V.22bis	none
Microcom	AX/2400c	$599	E		103, 212A, V.22, V.22bis	MNP, V.42
	QX/2400t[5]	$699	E		103, 212A, V.22, V.22bis	MNP, V.42
Multi-Tech Systems	MultiModem224M	$499	E		103, 212, 212A, V.22, V.22bis	MNP, V.42
	MultiModem224M7	$549	E		103, 212, 212A, V.22, V.22bis	MNP, V.42
Novation/RJD Associates	Parrot II	$159	E		103, 212A, V.22, V.22bis	none
OmniTel	Encore 2400SD	$449	E		103, 212, 212A, V.22, V.22bis	MNP
Orchid Technology	OrchidFax	$599	E	•	103, 212, 212A, V.22, V.22bis	none
Practical Peripherals	Mac Communications	$299	E		103, 212, 212A, V.22, V.22bis	none
	Package/PM2400SA					
	PM2400SA	$239	E		103, 212, 212A, V.22, V.22bis	none
	PM2400SA MNP	$299	E		103, 212, 212A, V.22, V.22bis	MNP
Prometheus Products	ProModem 2400M	$279	E		103, 212, 212A, V.22, V.22bis	none
	ProModem 2400MFax	$299	E	•	103, 212, 212A, V.22, V.22bis	none
	ProModem 2400MII	$399	I		103, 212, 212A, V.22, V.22bis	MNP
	ProModem 2400Mini-M	$239	E		103, 212, 212A, V.22, V.22bis	none
	ProModem 2400SE	$299	I		103, 212, 212A, V.22, V.22bis	MNP
	TravelModem	$299	I	•	103, 212, 212A, V.22, V.22bis	none
Racal-Vadic	2400 LC	$395	E		103, 212A, V.22, V.22bis	MNP, V.42
	2400 VP	$595	E		103, 212A, V.22, V.22bis	MNP, V.42
Shiva Corporation	NetModem V2400[1]	$599	E		103, 212A, V.22, V.22bis	none
Supra Corporation	SupraModem 2400	$149.95	E		103, 212, 212A, V.22, V.22bis	none
	SupraModem 2400 Plus	$199.95	E		103, 212, 212A, V.21, V.22, V.23, V.22bis	V.42
UDS	224CG	$795	E		103, 212, V.22, V.22bis	MNP
	224Plus	$550	E		103, 212, V.22, V.22bis	none
	2440	$550	E		212, V.22, V.22bis	MNP
	FasTalk 2400	$495	E		103, 212, V.22, V.22bis	none
	FasTalk 2400/5	$550	E		V.22bis	MNP
	FasTalk V.22b/42	$550	E		103, 212, V.22, V.22bis	V.42
U.S. Robotics	Courier 2400	$499	E		103, 113, 212, 212A, V.22bis	none
	Sportster 2400	$249	E		103, 113, 212, 212A, V.22bis	none
Ven-Tel	2400 Plus	$399	E		103, 212A, V.22, V.22bis	MNP
	2400 Plus II	$499	E		103, 212A, V.22, V.22bis	MNP, V.42
	Mac2400E	$399	I		103, 212A, V.22, V.22bis	MNP, V.42
Western DataCom Company	424 Class 5	$595	E		103, 212, 212A, V.22, V.22bis	MNP
	424 Line Backer	$695	E		103, 212, 212A, V.22, V.22bis	MNP
	424 MNP	$545	E		103, 212, 212A, V.22, V.22bis	MNP
	Mesa 424	$995	E		103, 212, 212A, V.22, V.22bis	MNP
	USA 224A	$395	E		103, 212, 212A, V.22, V.22bis	MNP (optional)
Xecom	FeedThru 2400	$249	E		103, 212A, V.21, V.22, V.22bis	none
	NewPort II 2400	$349	I		103, 212A, V.22, V.22bis	none
	NewPort SE30 2400 mnp5	$449	I		103, 212A, V.22, V.22bis	MNP
	NewPort II Fax/Data	$899	I	•	103, 212A, V.21, V.22, V.22bis, V.29	MNP
	NewPort MP 2400	$349	I		103, 212A, V.22, V.22bis	none
	NewPort MP 2400 mnp5	$449	I		103, 212A, V.21, V.22, V.22bis	MNP
	NewPort MP Fax/Data	$799	I	•	103, 212A, V.21, V.22, V.22bis, V.29	MNP
	NewPort SE 2400	$329	I		103, 212A, V.21, V.22, V.22bis	none
	NewPort II 2400 mnp5	$449	I		103, 212A, V.21, V.22, V.22bis	MNP
	NewPort SE30 2400	$349	I		103, 212A, V.21, V.22, V.22bis	none
	NewPort SE30 Fax/Data	$899	I	•	103, 212A, V.21, V.22, V.22bis, V.29	MNP
	NewPort SE Fax/Data	$799	I	•	103, 212A, V.21, V.22, V.22bis, V.29	MNP
	NewPort SE 2400 mnp5	$429	I		103, 212A, V.22, V.22bis	MNP
	QuadPort II 2400 [11]	$1499	I		103, 212A, V.21, V.22, V.22bis	none
	QuadPort II 2400 mnp5 [11]	$1799	I		103, 212A, V.21, V.22, V.22bis	MNP
	QuadPort II Fax/Data [11]	$2999	I	•	103, 212A, V.21, V.22, V.22bis, V.29	MNP
Zoom Telephonics	MX2400S with Sendfax	$199	E	•	103, 212A, V.21, V.22, V.22bis	none
	Zoom/Modem MX2400R	$199	E		103, 212, 212A, V.22, V.22bis	none
	Mac Pack					

Compression Protocols	Flow Control	Voice-to-Data Switching	Command Set	Security Support	Interface	Warranty
none	XON/XOFF		Hayes AT		25-pin RS-232C	2 years
MNP	HP ENQ/ACK, RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	1 year
MNP	HP ENQ/ACK, RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	1 year
MNP	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	2 years
MNP, V.42bis	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF		Hayes AT		8-pin DIN	1 year
none	none	•	Hayes AT		25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	1 year
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	5 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	5 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT, MNP		25-pin RS-232C	5 years
none	none	•	Hayes AT		25-pin RS-232C	2 years
none	none	•	Hayes AT		25-pin RS-232C	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		NuBus board	2 years
none	none	•	Hayes AT		25-pin RS-232C	2 years
MNP	RTS/CTS	•	Hayes AT		8-pin DIN	2 years
none	RTS/CTS	•	Hayes AT		Mac Portable board	2 years
MNP	RTS/CTS, XON/XOFF	•	Extended Hayes AT		25-pin RS-232C	1 year
MNP	RTS/CTS, XON/XOFF	•	Extended Hayes AT		25-pin RS-232C	2 years
none	XON/XOFF		Hayes AT	•	LocalTalk 8-pin DIN	1 year
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	1 year
MNP, V.42bis	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	1 year
none	none		Hayes AT	•	25-pin RS-232C	1 year
none	none		Hayes AT		25-pin RS-232C	1 year
MNP	none		Hayes AT		25-pin RS-232C	1 year
none	none		Hayes AT		25-pin RS-232C	1 year
MNP	none		Hayes AT		25-pin RS-232C	1 year
none	none		Hayes AT		25-pin RS-232C	1 year
none	none		Hayes AT		25-pin RS-232C	2 years
none	none		Hayes AT		25-pin RS-232C	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	5 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	5 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		NuBus board	5 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	1 year
MNP	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	1 year
MNP	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	1 year
MNP	RTS/CTS, XON/XOFF	•	Hayes AT	•	25-pin RS-232C	1 year
MNP (optional)	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	1 year
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		NuBus board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		Mac SE/30 board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		NuBus board	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		Mac Portable board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		Mac Portable board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		Mac Portable board	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		Mac SE board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		NuBus board	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		Mac SE/30 board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		Mac SE/30 board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		Mac SE board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		Mac SE board	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		NuBus board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		NuBus board	2 years
MNP	RTS/CTS, XON/XOFF	•	Hayes AT		NuBus board	2 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	7 years
none	RTS/CTS, XON/XOFF	•	Hayes AT		25-pin RS-232C	7 years

*E = external; I = internal.

†Allows modem sharing over AppleTalk network.

‡Cellular telephone option available.

§To be announced.

||Provides four devices (either modems or fax modems) on board.

cally after a specific number of rings.

Many modems can store and dial frequently called numbers in *directories.* A directory is helpful, but not critical. Most communications programs let you create directories—usually ones that store more numbers than the modem—via macros or scripts.

Several modems can autoredial automatically as well. Depending on how it's implemented, the modem can be set to either automatically redial busy numbers a specific number of times, or redial until a connection is made. Like the phone directories, this feature is usually available in software.

Voice-to-Data Switching A number of modems allow you to switch freely between data and voice mode without breaking the connection and redialing. This feature is extremely useful for managing first-time connections with new communications partners and getting two modems on speaking terms—setting the correct speed, parity, and so on. Also, after finishing a session, it's often nice to be able to clarify some points verbally.

Security Features If you plan to leave your modem on all the time, security is a legitimate concern. Unauthorized users can do significant damage to an unprotected system. The security features most often implemented in hardware are passwords and call-back verification. With the latter, when a remote user attempts to log on to the system, the local modem disconnects, then promptly calls the remote user back at a predetermined phone number—reconnecting the two systems. But be prepared to pay extra for security. Jasmine's TalkBac and Ven-Tel's 2400 Plus II, Anchor Automation's Anchor 24E5 Secure, E-Tech's Bulletmodem E2400M, and Multi-Tech's MultiModem 224M all offer security features for under $500.

Bundled Software Many vendors include popular and powerful Mac telecommunications software programs in the cost of the modem, or as an option. For example, both Prometheus Products and La Cie offer MacKnowledge. Practical Peripherals bundles MicroPhone, while Hayes offers Smartcom II. Then, there's Ven-Tel, which makes Microsoft Works available as an option with its modems.

Certainly, the fact that a vendor bundles a certain program with its modem means that the software works with the modem. And taking advantage of bundled software can be an easy way to jump online—provided that you want to use that software.

Important Intangibles

The proof of the pudding is in the eating. Features alone don't guarantee you'll find happiness with a modem. In fact, after scanning the list of modems in "Fistful of Modems," you'll no doubt find many with the features you need. What else should you consider when choosing?



Turn your Mac into a full-fledged communications center with fax modems. They're available as internal boards and external units.

First, you must connect the modem to your Mac and phone line. That's not always automatic or simple. All serial cables are not the same: having the correct type of connectors doesn't guarantee compatibility. Remember, too, that the older Macs—128K, 512K, and 512KE—use what are called DB-9 connectors in their modem ports. All Macs starting with the Plus have mini 8-pin DIN connectors.

If the modem manufacturer can provide the right cable for you, you'll be a lot closer to plug-and-go than if you just wing it on your own. I know. When I attempted to hook an original Apple 1200 modem to my Mac Plus, it took four weeks, and I went through four different cables—all of which had the right physical connector—to find one that worked correctly.

Unless you have money to burn or are a gambler at heart, buying on specs alone is a dangerous move. Though most 2400-bps modems offer many of the same features, they're not all alike. The way one manufacturer decides to implement data compression or error control can differ substantially from the way another does it. This leads to major differences in how modems perform under adverse conditions—when there's substantial noise on the line, for instance.

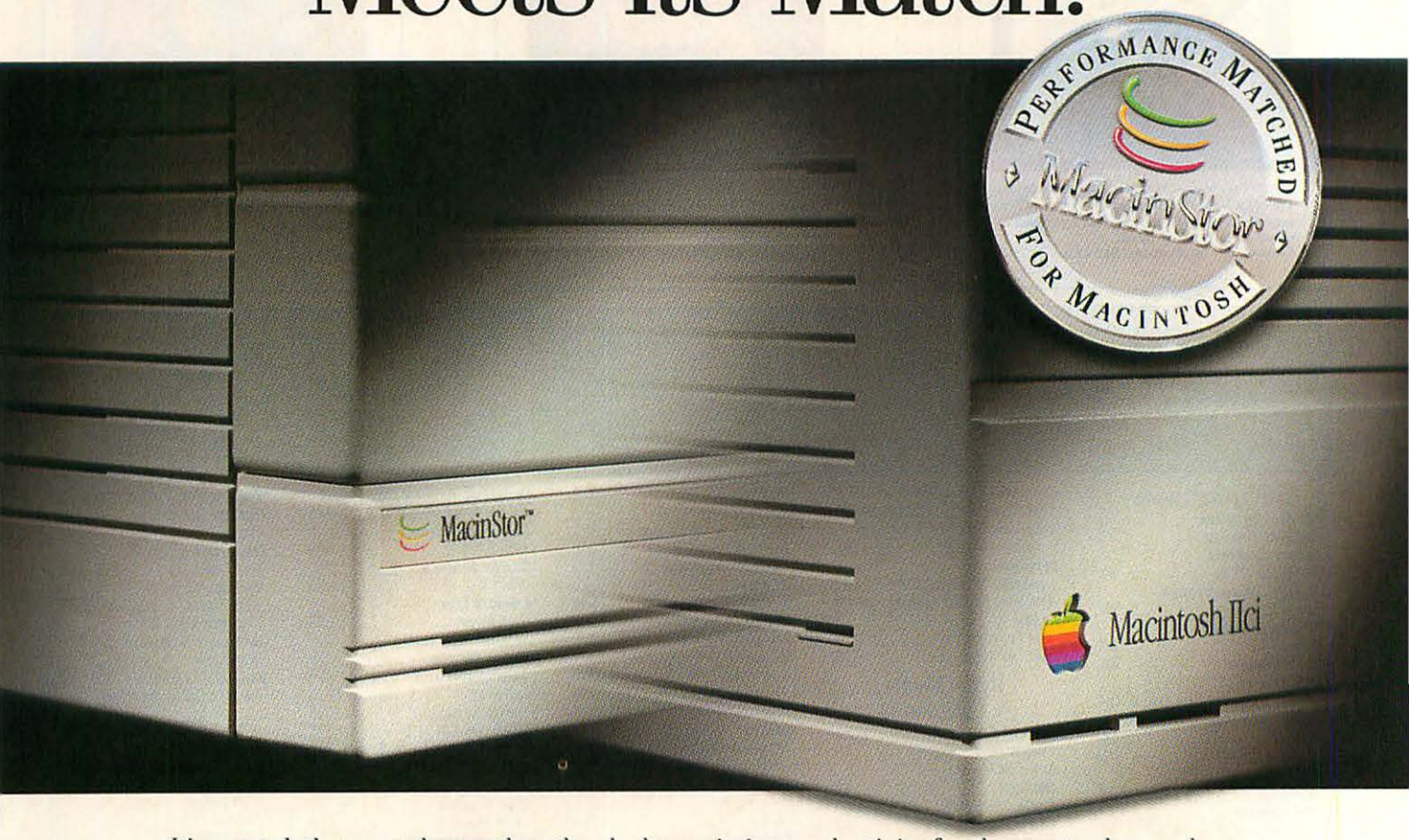
The product's warranty, along with the manufacturer's reputation for customer support and reliable products, should be considerations as important as features when buying a modem. Length of warranty ranges from Apple's usual 90 days to as long as 5 years (Practical Peripherals) or 7 years (Zoom Telephonics). Your best source on long-term reliability, quality of support, and company reputation are friends and the nearest user group.

Among price-conscious consumers, cost is an important factor. Don't let it be the only factor. You should carefully consider the value of your time and data in the equation, as well. If you have noisy phone lines, for example, the added reliability of a modem with error control should be worth the extra expense. Cheaper equipment sometimes implies lower reliability. (Remember those $12 phones you bought shortly after AT&T was split up?) If the modem is difficult to configure or fails regularly, the money initially thought saved may prove to have been wasted. M

See *Where to Buy* for contact information.

***Steven Schwartz** has been writing about Apple II and Macintosh products for 12 years. He was the original editor of* Software Digest, *and is currently the director of technical services for Funk Software.*

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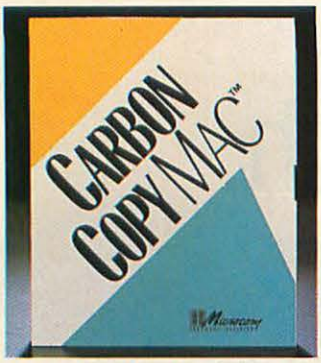
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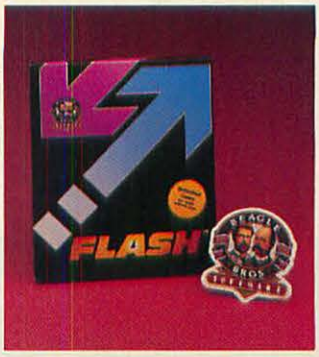
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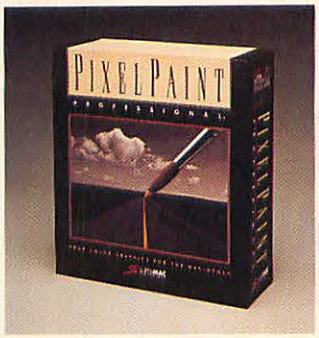
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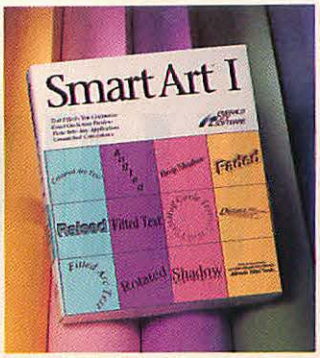
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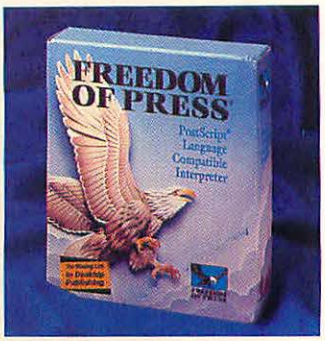
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REVIEWS

Sound Digitizing System

AUDIOMEDIA 1.2

Pros: Compact disc–quality stereo recording and playback; direct-from-disk playback within HyperCard stacks.
Cons: Some software bugs.
Company: Digidesign. **Requires:** Mac II; high-capacity hard disk with 28ms or faster average access time. 2MB RAM; high-impedance microphone recommended. **List price:** $995.



ROBERT HOLMGREN

Josh Rosen, producer at San Francisco's MetaLanguage, uses his Audiomedia board for digital audio recording used in video and interactive Mac-based presentations.

A picture may be worth a thousand words, but sound has value, too—especially in multimedia productions, where it can complement animation and video. The Mac can play back digitally recorded sounds with no additional hardware, and with a sound digitizer such as Farallon Computing's popular MacRecorder, it can record sounds, too (see *Reviews,* December 1989).

But the Mac's intrinsic audio features have some shortcomings. A Mac can reproduce sound about as well as an AM radio—that's not bad, but it's not up to the standards of professional multimedia producers. A more serious problem is that the Mac must load an entire recorded sound into memory before the sound can be played. That imposes severe restrictions on sound length. Given these constraints, it isn't surprising that sound takes a back seat to pictures in the Mac multimedia world.

Digidesign's Audiomedia may change that. Audiomedia is a $995 hardware and software combination that greatly enhances the recording and playback features of any member of the Mac II family. Think of it as an upscale MacRecorder.

Audiomedia enables the Mac to sound as good as a compact disc player, providing 16-bit, 44.1kHz stereo recording and playback. Audiomedia addresses the memory issue by allowing the Mac to record and play sounds directly to or from a hard disk. Thus, the length of play is limited only by available disk space. And Audiomedia includes drivers that let you play back its recordings from within HyperCard as well as from MacroMind's VideoWorks II and Director.

The Sounding Board

Audiomedia's hardware is a NuBus board containing a Motorola DSP56001 digital signal processing (DSP) chip, a 24-bit microprocessor designed for the number-crunching demands of digital audio. The DSP chip works with the board's other circuitry to provide the analog-to-digital and digital-to-analog converters needed to record and play back sound. (For background information on digital audio, see "Getting Started with Digital Sound," *Macworld,* November 1989.)

The Audiomedia board installs in a flash, requiring no tools beyond the Phillips screwdriver needed to open the Mac II's case. On the back of the board are a microphone jack and four RCA jacks, two of which are input jacks that accept audio from a tape deck, compact disc player, or other sound source. Audiomedia can record from those two RCA and microphone jacks simultaneously, allowing you to record, for example, a voice narration

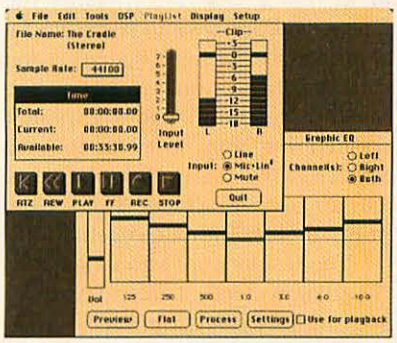
and background music in one step.

The other two RCA jacks are for output; they connect to a stereo amplifier. Alas, none of the jacks are labeled, so you must consult the manual to tell input jacks from output. Another snag: the otherwise excellent manual fails to mention which jack of each pair is for the left input or output on the amplifier and which is for the right input or output. A peel-and-stick label that you could attach to the Mac's case would help, as would a short software sound file for verifying that the output jacks are correctly connected to the input jacks on your amplifier.

Sound Software

Audiomedia's software includes the Audiomedia application and SoundAccess, a HyperCard stack that lets you record and play back Audiomedia recordings from within HyperCard. SoundAccess also lets you install playback buttons for interactive recording and playback within your own stacks. The stack is nicely designed and loaded with online help.

You can use the Audiomedia application to record, alter, and play back recordings. Each recording, or sound file, appears in its own window. To record, just click the window's tape-recorder icon. A new window appears containing volume meters and a slider for adjusting the input sound level, as well as buttons for rewinding, fast-forwarding, and playing the recording (see "In the Studio").



In the Studio

Audiomedia's record window (upper left) has a volume slider and dancing volume meters that let you adjust the input volume before recording. Familiar-looking controls let you record, rewind, fast-forward, and play back the recording. Audiomedia's on-screen graphic equalizer, which uses the DSP chip's processing power to change a recording's tonal qualities in real time, appears in the lower-right corner.

While recording, Audiomedia expertly shuttles incoming data from the Mac's memory to your hard disk—provided the hard disk has a 28ms or faster average access time. If the disk isn't fast enough, parts of the recording will be lost, and you will need to try again with a slower sampling rate. (Audiomedia's manual includes a list of hard disks that do meet its requirements.)

Audiomedia's editing features range from impressive to mind-blowing. As with most sound-editing programs, you can cut and paste portions of a recording and you can alter individual sound samples using a MacPaint-like pencil tool. To locate exact spots on the recording, there's a Scrub mode that lets you slowly play the recording forward and backward—like rocking the reels of a reel-to-reel tape recorder back and forth.

The remarkable playlist-editing feature lets you rearrange a recording—remove or rearrange words, cut or add verses to a song, or repeat a section—without changing the original sound file. You do so by selecting specific areas of the recording (such as a single verse), naming them, and then arranging those names in the Playlist window. You can change how a recording plays back by rearranging names in its Playlist window. You can create and save as many playlists as you like.

You can also mix two recordings or fade from one to the other. You can change a recording's tonal qualities using an on-screen graphic equalizer and hear each change as you make it. You can even change a recording's length without altering its pitch—handy if you have a 35-second music passage that has to fit a 30-second animation, or you want to stretch 30 seconds of play over 35 seconds.

I did encounter a few bugs in Audiomedia. Some were cosmetic, such as an occasional garbled-looking dialog box. Others were more serious, such as infrequent system crashes when I was using the Scrub tool. Generally, however, the software and hardware performed admirably. Digidesign's track record for updates and support is excellent, too, so it's safe to assume that future versions will behave even better.

At $995, Audiomedia may seem like an expensive add-on, but it's quite affordable when you consider the much larger cost of such multimedia hardware as large-screen color monitors and 24-bit video boards. Audiomedia could also do duty in a recording or television studio, although Digidesign's Sound Tools system, which supports SMPTE synchronization codes and digital audio tape, is preferable for such applications.

Audiomedia can't guarantee stunning soundtracks. The quality of a recording depends on the quality of the other components of your audio system and on your skills as a recording engineer. Audiomedia is a specialized product for multimedia professionals and audiophiles, not for the businessperson who now and then puts together a presentation. But for those multimedia pros, Audiomedia is a boon. There isn't another product like it.—**Jim Heid**

See **Where to Buy** *or circle 711 on reader service card.*

☆

Halftone and Color-Separation Utility

POSTERWORKS 1.01

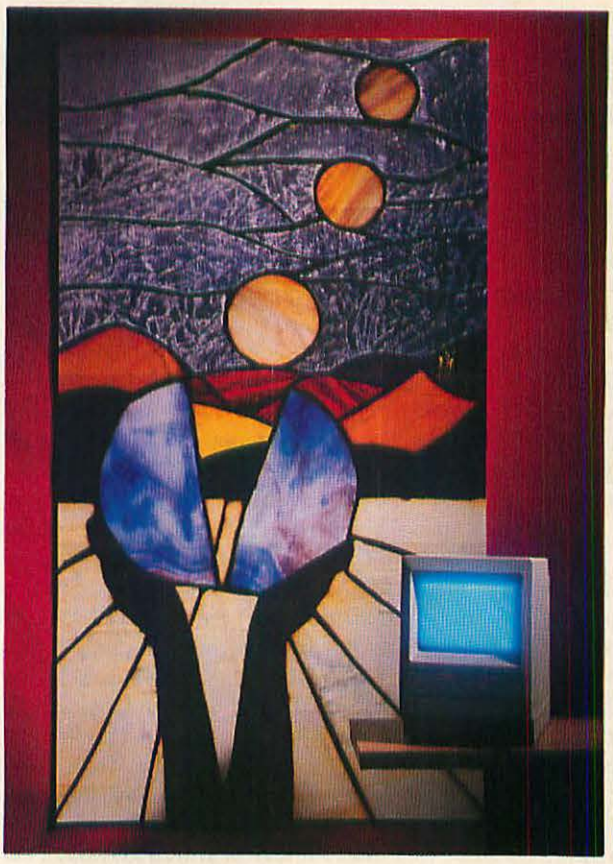
Pros: Allows precise control when printing halftones and process color images; manipulates large images without requiring a lot of memory. **Cons:** Poorly organized manual; no background printing. **Company:** S. H. Pierce. **Requires:** Mac Plus. 20MB hard disk and System 6.0.3 recommended. **List price:** $167.

I haven't been all that impressed by color printing technology for the Mac. Even hard-copy color printers haven't been able to rival output created by conventional photographic techniques. Until now, that is. S. H. Pierce's PosterWorks makes it possible, for the first time, to create high-quality large-scale color images on the Macintosh by giving you the tools to tweak images the way a professional color shop would.

In order to create a poster on the Mac without PosterWorks, you might scan an image (color or gray-scale), *(continues)*

touch it up with an appropriate graphics-editing program, scale it up to the appropriate size, and if you only need a few copies, print it on a PostScript-compatible printer. If the poster is destined for a production run, you might create color separations on a high-resolution PostScript-compatible typesetter. In either case, you are likely to be disappointed in the results.

That is because full-color printing is hard to do. When you create a poster by more conventional means, the color separations are handled by a technician who analyzes the original artwork and—drawing on training, experience, and expensive prepress proofing equipment—makes certain decisions regarding how the separations should be made. The screen angles may be changed to eliminate moiré patterns. One color may be emphasized or diminished to eliminate a color cast. Black ink is often added to enhance sharpness and contrast, and a corresponding reduction of color ink may be called for. The screen frequency (dots per inch) may be changed to better correspond to the image size after scaling. When a quality color shop does separations, the results are far better than what can be achieved using simple, mechanical processes.



MARK JOHANN

Dazzling Posters **PosterWorks printed this 36-by-64½-inch image of a stained-glass original by Dave Martin on a QMS ColorScript 100 color PostScript printer model 30. PaperWorks let me manipulate the color density, undercolor removal, contrast, and amount of black to print using a series of easy-to-change curves.**

Professional Tools

PosterWorks, however, gives you access to the same tricks and techniques that professional color printers use, and if you know how to use them, you'll get great results. The program accepts an image in TIFF or Scitex CT2T format, then allows scaling, changes in screen angles and frequency, color or contrast correction, addition of black, and undercolor or gray-component removal. If it will take multiple pages to print the scaled image, PosterWorks can add crop lines, alignment marks, page numbers, and row and column numbers to the margin of each page. PosterWorks then creates a PostScript file that describes the image. This PostScript file can be sent (using the SendPS utility provided) to any PostScript-compatible output device; alternatively, it can be processed using a PostScript clone interpreter. PosterWorks won't let you edit the image, since everything is controlled with numbers and curves. You cannot even preview the image on the screen; though, if you could, the fact that the screen uses an entirely different display technology would make previews only marginally useful.

To really check out PosterWorks' capabilities, I selected a 35mm color slide of a stained-glass window. I had it scanned with a Scitex scanner and imported using DeScipher software from Premiere Graphics. Then, using PosterWorks on a Mac II, I sent the 32-bit, medium-resolution image—all 5 megabytes of it—to a QMS ColorScript 100 model 30 color PostScript printer.

Worth the Wait?

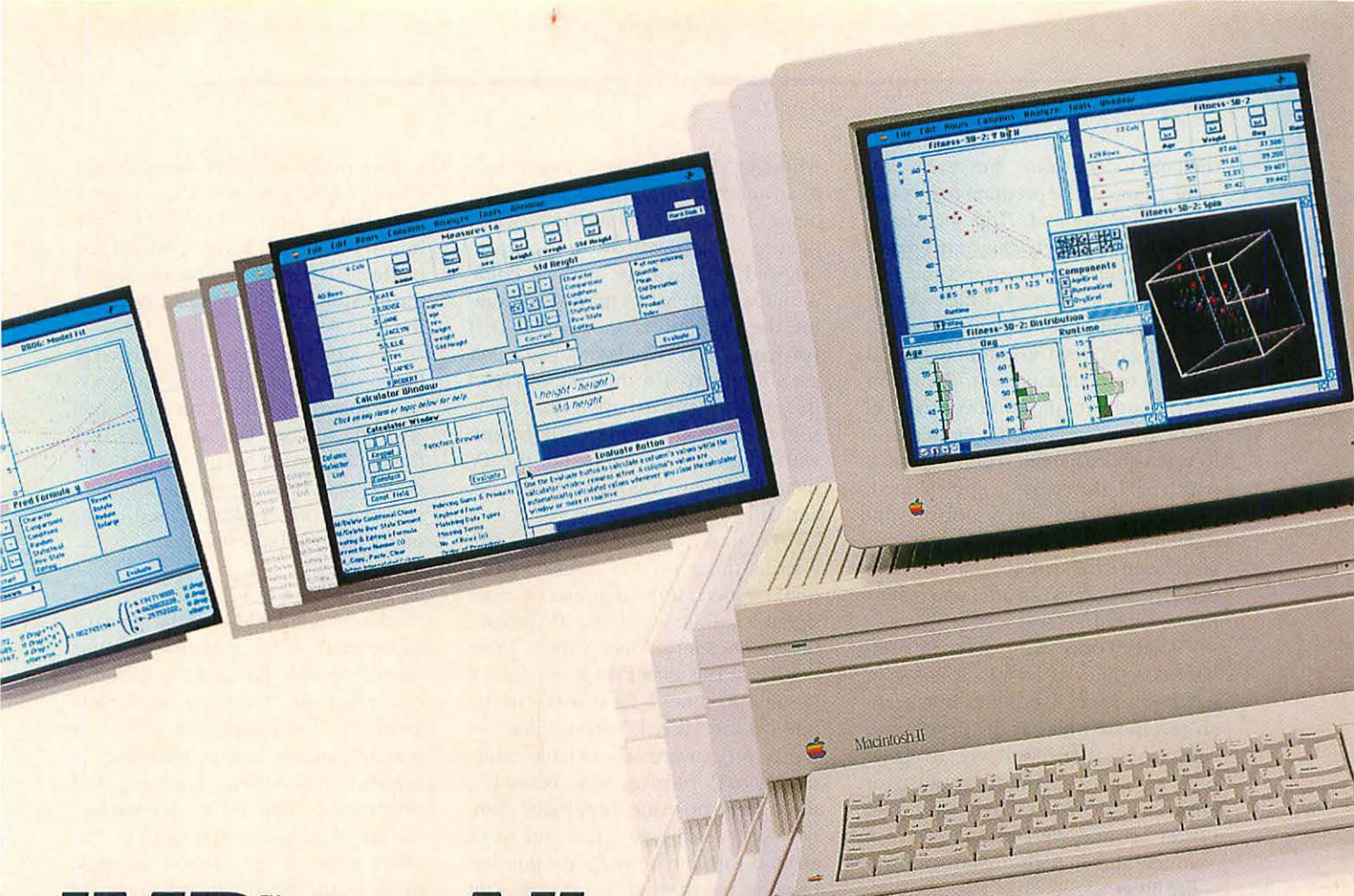
It took some patience to get the image exactly the way I wanted it. PosterWorks lets you specify a scaling factor or a finished image size, but if you want to fit the image exactly to a certain number of pages you have to do some manual calculations. I printed some tabloid-size versions of the poster while I fiddled with added black and undercolor removal. PosterWorks generated the PostScript files quickly, but actually printing the posters took some time. It took nearly six hours to print a 36-by-64½-inch poster—20 tabloid pages—on the ColorScript. This is a serious consideration if the closest color output device is at a service bureau that charges by the hour. The SendPS utility doesn't have any progress indicators, and it cannot run in the background; incorporating the functions of SendPS into PosterWorks, along with background operation and some feedback, would make printing much more convenient. The printer crashed during my first attempt, and SendPS didn't even report the problem for over two hours. The second print run went without a hitch.

The results were astounding (see "Dazzling Posters"). I used to consider 300-dpi, fixed-dot-size printers unsuitable for serious color work. I discovered that, at least for large-format images, the ColorScript 100 was more than ready for the job. What had been lacking was proper software.

Gripe, Gripe, Gripe

When you're looking at the beautiful images that PosterWorks produces, it's

(continues)



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difficult to complain, but there are some things in the program that could stand improvement. The manual is excellent, but the background material you need to understand the rest of the text is in the back. Unless you're already familiar with halftoning and screening on desktop computers, read the back of the manual first. The menu choices aren't really intuitive, and you cannot double-click on a Finder icon to open an image file. There is a bug, which S. H. Pierce has acknowledged, that changes the font used for window titles to Geneva. Though this glitch seems to be more annoying than dangerous, it persists until you restart the Macintosh.

PosterWorks won't turn an ordinary computer user into a color or halftone expert overnight, but it enables anyone who has the desire, and sufficient patience, to create great posters. This program is a must for anyone who has a need to create poster art and who has access to a scanner and a high-quality printer.

—Ron Risley

See **Where to Buy** *or circle 825 on reader service card.*

Cable-Ready Monochrome TV Board

MICROTV 1.1

Pros: Simple to install; elegant software. **Cons:** Tiny, grainy, black-and-white picture; limited number of channels; weak tuner. **Company:** Aapps Corporation. **Requires:** Mac II; 8-bit color monitor. **List price:** Version 1.2 $395 (Pro version $595).



Lo and behold, a device that allows you to watch TV on the Mac has found its way into the businesslike world of computing. Called the MicroTV, it's a board for the Mac II series that slips into a NuBus slot. All you do is connect a cable, antenna, or other video source, and you can indeed watch TV while you work. There's even a little onboard speaker.

Small-Time Operator

Beyond this simple functionality, however, the MicroTV is a jumbo letdown. The primary problem is the picture: it's tiny (1½ inches square), black-and-white, pixelated (grainy), and subject to an annoying flicker. The irony of its being a black-and-white (gray-scale) picture is that the board works properly only if you have an 8-bit *color* monitor. If you have a gray-scale monitor, the TV controls don't show up; if you have a 4-bit color board, you won't get any picture. (By the time you read this, Aapps hopes to have released new software that allows the board to work with 4-bit color monitors, but the TV picture will have a slower refresh rate, and thus will seem jerky.)

To make matters worse, the board's tuner isn't as robust as you might expect; if the antenna or cable signal is a little weak, the TV picture deteriorates into a snowy mess. (You don't see this effect on a normal TV because its tuner is far superior to the one on the MicroTV board.) And let the buyer beware: if you have cable, the MicroTV receives only channels 2 through 14, no matter how many channels you usually get. You can work around this limitation by routing the cable signal through your VCR—but then you can change channels only by using the VCR, not the on-screen control panel.

Here's another problem: a cable-TV cable carries the sound signal at a slightly higher frequency than the video signal. It's up to your TV's tuner to make sense of the signals and adjust for any frequency fluctuations. Because the MicroTV's tuner isn't able to make such on-the-fly modifications, I found using it with the Manhattan cable signal to be an exercise in frustration. When I got the MicroTV picture as good as it could be, there was a continuous staticky hum in the sound. Using the MicroTV's on-screen fine-tuning controls, I eliminated the hum—but in so doing, I ruined the picture. To restore the picture I used the fine-tuning controls again, but then the hum returned.

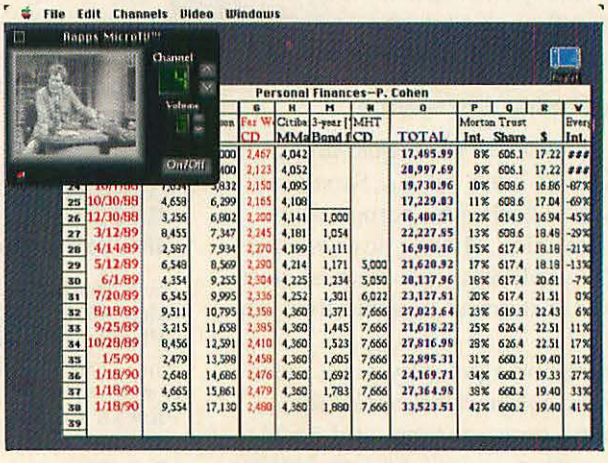
In general, the sound of the board's speaker is pretty good—certainly superior to the picture. If there's anything to complain about, it's that the people on TV sound a little tinny; oddly enough, they sound as if they're speaking from inside a slotted, platinum-colored plastic box.

On/Off/Vol

It's doubly regrettable that the MicroTV hardware is so disappointing, because everything else about the package is commendable. The software, for example, is sleek, attractive, and functional, featuring a neat pseudo-LCD readout; fine-tuning, contrast, and brightness controls are in a hidden flip-out panel (just like on a real TV). Another nifty software touch: a single press of the Space bar captures the current TV image to the Clipboard, providing a quick-and-dirty low-res video digitizer. Of course, you'll probably wish that there were a desk accessory version of the software; as it is now, you can only watch-and-work under MultiFinder.

Furthermore, the whole thing is delightfully simple. There are no INITs or other installables to add to the clutter of your System Folder; no adapters are needed for your cable; and the manual, while no masterpiece, is at least succinct.

(continues)



Late Night
Watch David Letterman while you crunch numbers—if you have a magnifying glass; that picture is about 1½ inches square. The MicroTV board has a standard jack for a cable, VCR, or antenna, as well as three RCA jacks: direct VCR audio and video inputs and an audio output.

It's only a matter of time.

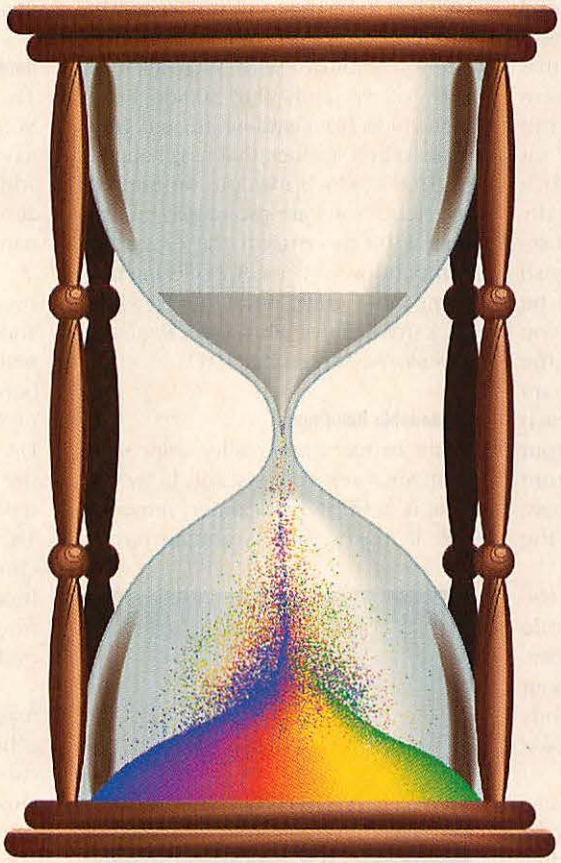
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M

Hardware Hello

But it might be that Aapps has bitten off more than it can chew in its attempt to create an inexpensive Mac TV with respectable quality. The RF interference generated inside the computer certainly does not help the picture quality, and the cost of high-quality tuners no doubt accounts for the feebleness of the tuner used on the MicroTV.

For these reasons, it's hard to justify the purchase of a MicroTV. The TV picture is too small and jittery to see much; even if you spend the additional $200 to buy the Pro version of the board—which buys you a 3½-inch-by-3-inch picture—you sacrifice smoothness of the TV picture. (The refresh rate of the normal-size—1½ inches square—picture is 30 frames per second; the larger version's is only 20 to 24 frames per second, so it's like watching an old movie.)

The MicroTV could prove useful in some cases, to be sure. Aapps—fantasizing productively—suggests that the MicroTV could be used for security purposes. Because you can run several MicroTV boards at once (at the great expense of refresh speed), a security guard could theoretically watch the displays of a number of security cameras on a single Macintosh screen. And because Aapps will be marketing a developer's kit, too, you could write custom software for the MicroTV. You could write a program that could, for example, compare each frame of the security camera's output with the previous one; if the picture changed from one frame to the next, the program would beep to alert the security guard.

But if you just want to watch the game—or the game show—while you're working, here's a better idea. You can walk downtown and, for about a third of the cost of the MicroTV, buy either a Sony Watchman or a *color* Casio portable TV. Either could sit beside your Macintosh without requiring the use of MultiFinder or covering up any spreadsheet cells. In other words, until the MicroTV's price comes down, its picture quality improves, or both, the Aapps dream of an inexpensive, functional in-Mac TV is still only a fantasy.—**David Pogue**

See **Where to Buy** *or circle 778 on reader service card.*

300-dpi Color and Gray Scanner

MSF-300Z COLOR/GRAY SCANNER

Pros: Inexpensive; includes SuperPaint 2.0, Digital Darkroom, and PhotoMac Edit; scans via included DAs; comes with scanning modules for Digital Darkroom and ImageStudio; good selection of halftone dithers. **Cons:** 3-by-8-bit scanning insufficient for high-quality separations; separate SCSI interface and power supply; separate DAs for color and black-and-white scanning; no 4-bit save option for gray scans; limited resolution and scaling options. **Company:** Microtek. **Requires:** Mac Plus; Mac II with 2MB RAM for color. 4MB RAM recommended. **List price:** $2695.

There are few things that make a color Mac II look better than a scanned color photograph on screen. Until recently, though, the cost of color scanners has been prohibitive. With Microtek's release of the MSF-300Z 300-dots-per-inch color, black-and-white, and gray-scale flatbed scanner, that has changed. At $2695 (which includes an impressive set of software programs) it costs only $500 more than the gray-scale competition—Microtek's offering that scans only grays, and the Hewlett-Packard ScanJet Plus (see *Reviews, Macworld,* September 1989).

Reasonable Renditions

Don't expect high-quality color seps from Microtek's color scans, however. This is a 3-by-8-bit scanner, meaning that it makes three scanning passes over an image—one each for red, green, and blue—and it really captures only 8 bits of information on each pass. That 24 bits is just not enough information for high-quality separations. You can produce reasonable renditions of color photos with separations from this scanner, but don't expect to really impress anyone (see "In the Park").

If, however, you need color scans for comps, for on-screen work such as presentations and multimedia projects, for creating art with color-paint programs, or for creating slides, this scanner is the ticket.

Along with the scanner you get Digital Darkroom, a nice gray-scale image editor, and SuperPaint 2.0, for editing black-and-white images. You also get PhotoMac Edit (PhotoMac without the color-separation capability), which is nice for color correction. The included software lets you do most things you might want to do to most images—except color-separate them.



MARK JOHANN

MSF-300Z Color/Gray Scanner

Hardware, Software, and Installation

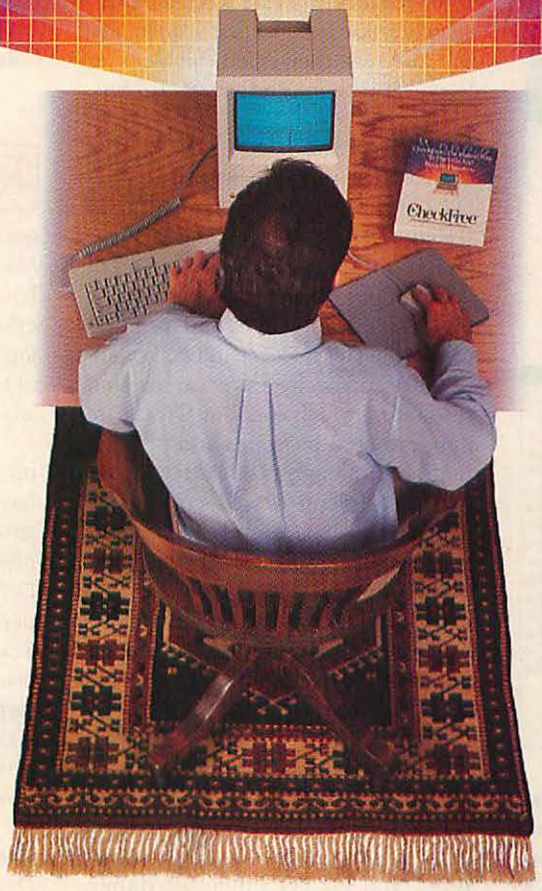
The scanner comes with an external SCSI unit and power supply. You have to open the SCSI unit to change SCSI addresses or plug in SCSI terminators, although you can use a normal terminator on the cable.

The scanning software consists of two desk accessories, one for color and one for black-and-white or gray-scale scanning. It's annoying to shift between the two, but it's not a big problem. You copy an INIT for each DA into the System Folder and restart the Mac. Thereafter you just load the desk accessory and start scanning. There are also scanning modules included for Digital Darkroom and ImageStudio, so you can scan directly from within those programs without even using one of the DAs.

The scanning software lets you make a quick preview scan, then draw a box around the area you want to capture. The preview window is so small, though, that it's hard to adjust precisely (see "Scanning DA"). You should scan a larger area than you actually need and crop images after you've captured them. You can adjust brightness and contrast in 3 percent increments (red, green, and blue are adjustable separately); choose between

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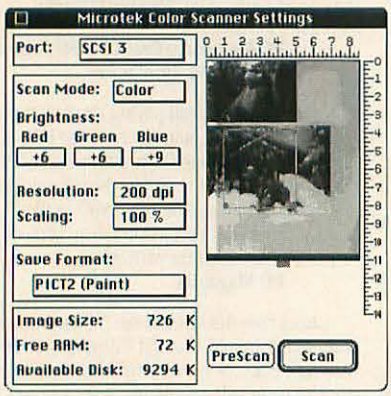
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In the Park

This photograph was scanned at 200 dpi, color-corrected, sharpened, and separated with a prerelease version of Adobe's Photoshop, and output on a Linotronic 300. This is not the best separation possible with this scanner, but it is representative.



Scanning DA

The Microtek scanning DAs (one for color, shown here, and one for gray scale and black and white) let you preview an image in a small window, then draw a box around the area you want to capture. It shows you how much disk space you have available and how much you need (all-important with 24-bit color scans).

line-art, halftone, and gray-scale modes for black-and-white or gray-scale scanning; and set the resolution and scaling percentages in 15-dpi or 15-percent increments. You can save black-and-white and gray scans in TIFF, PICT, or EPS format, and save color scans in 8-bit PICT or 24-bit TIFF and set the resolution in 15-dpi and scaling in 15 percent increments.

What about Black and White?

This scanner is a great deal for many types of color work, but if the bulk of your final output is to laser printers, the MSF-300Z does have some limitations compared to the Hewlett-Packard ScanJet Plus, the best bet for black-and-white scanning and in a close race with Microtek's 300G scanner for best gray-scale scanner. You can't scan with 16 gray levels (4 bits), for instance. It's either 2 gray levels or 256. Laser printers often do fine with 16 gray levels, and 16-level files are half the size of 256-level files. In order to create a 16-level file, you have to first scan an image in 8 bits, then open the file with Digital Darkroom, and save with 4 bits.

Avoiding Ugly Plaids

The biggest problem with the MSF-300Z, however, is the limitation of scaling and resolution settings. You are limited to adjustments in 15-percent and 15-dpi increments, compared to the ScanJet's 1-percent and 1-dpi increments. This makes it difficult or impossible to specify a precise size and resolution, which is essential for scanning dithered halftones and printing them without ugly plaid patterns. Precise adjustments would enable you to save disk space and still get the best quality you could from laser-printer output.

The MSF-300Z scanner offers a nice array of 12 halftone dither modes, much better than the ScanJet's. However, there is no diffusion dither—a randomized dither that makes no attempt to simulate traditional halftoning but produces excellent laser output, although it can be difficult to reproduce on a photocopier or on a press. You can get a diffusion dither, however, by capturing gray-scale scans (paying the price in disk space) and then printing with Digital Darkroom's advanced halftoning feature.

Does Color Come First?

Buy this scanner if you need to print comps from color printers, produce on-screen presentations or slides, work with color images in paint programs, or produce medium-quality color seps. Don't buy it for high-quality color sep work, and think twice if what you really need is a black-and-white or gray-scale scanner specifically for laser output. The ScanJet Plus, listed at $2190, will serve you better in that role, although you'll need to buy a gray-scale editing program to go with it.—**Steve Roth**

See **Where to Buy** *or circle 814 on reader service card.*

2-D and 3-D Graphs

DELTAGRAPH 1.0

Pros: Wide variety of graphs; easy to use; well-designed interface; highly adaptable; strong data handling and output. **Cons:** Limited number of data-manipulation tools. **Company:** DeltaPoint. **Requires:** Mac Plus; System 6.0.2. Hard disk recommended. **List price:** $195.

With many business people, scientists, and engineers relying heavily on presentation graphics to display spreadsheet data, Macintosh spreadsheet developers have leapfrogged one another in their efforts to add better and better graphing capabilities. So far, however, none of them have been able to provide an all-in-one solution.

To fill this void, creators of add-on graphing and charting programs have attempted to provide power spreadsheet users with more complete presentation-quality graphics. DeltaGraph—developed by the same people who created the spreadsheet Trapeze—has taken the design established by CA-Cricket Graph several steps further with such features as 3-D graphs, full-color support, improved data handling, and a complete object-oriented toolbox.

What's in It for You?

DeltaGraph uses a cell matrix, called a notebook, to store data. You can store multiple pages in and attach multiple graphs to each notebook. You can import data into the program in any of the standard formats created by spreadsheets and databases. Select a range of data, click on the plot icon on the worksheet, choose the plot you want, and the graph appears. It's easy, and it's straightforward. There are 30 preset graphs to choose from: 15 in 2-D, 7 in 3-D, and 8 that you can customize yourself.

DeltaGraph's object-oriented graphing means that every element of a graph can be selected and altered. You can resize the entire graph with a click and a drag, or explode a pie chart one slice at a time. Each set of labels, tick marks, colors for data series, sym-

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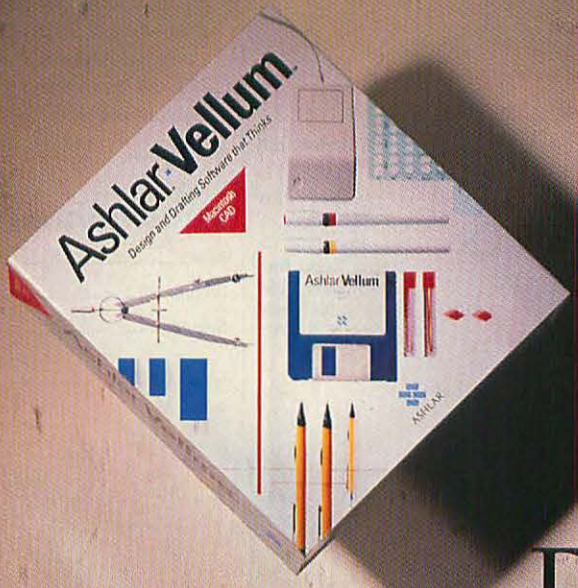


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bols for data points, and so on can also be formatted. Graphs can be 8-bit color with 256 colors, or black-and-white with 256 shades of gray.

DeltaGraph has one of the best interfaces I've seen. I am impressed with the look and the feel of the entire program; it's very accessible, particularly to a beginning user. Every tool you expect to find in an object-oriented drawing package is here. When you specify a change in a dialog box, such as a different viewing perspective, you can view the change before confirming it. Undo and recovery are included, and warnings are clear and timely for any actions that may have detrimental results. CA-Cricket Graph's strength is its straightforward simplicity; DeltaGraph extends that functionality considerably without paying a noticeable penalty in complexity.

Perhaps the hardest choice you have to face is which type of graph to use in a given situation. DeltaGraph's well-written documentation is most helpful in that regard—it includes a nice blend of tutorials for the novice, as well as some sophisticated features for the experienced user. Online help is less comprehensive, but usually adequate to the task at hand.

Much of what I like about this program has to do with its many extra features, including a symbol font package, and links to Excel 2.2 documents (for updating any graph created from Excel data with the click of a button). It's not the hot link (automatic updating) expected with System 7.0, but it's nice anyway. You can attach notes to each notebook, and bring them up in their own window. Color shading is available and although it's patterned and grainy at 8 bits, 24-bit color users are in for a treat. The complex color graphs created by DeltaGraph work better on faster Macs.

DeltaGraph prints in PostScript as well as in QuickDraw, making the program suitable for a wide variety of output devices. Be aware that some colors do not translate precisely, and that you may need to experiment to get the color registration you desire.

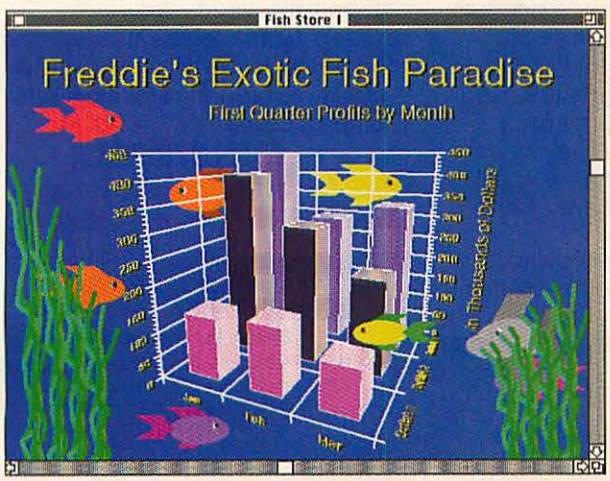
I highly recommend DeltaGraph for most users requiring presentation-quality graphs. No power spreadsheet offers this range of tools, nor is one likely to do so in the foreseeable future. What's in this package is a great improvement over tools found in Excel 2.2; even Wingz users will benefit.

If you require complex graphs for scientific or engineering applications, a program with more specialized data-handling tools—such as KaleidaGraph 2.0 by Synergy Software—is worth investigating. DeltaGraph offers some 20 built-in data-manipulation functions, including curve-fitting tools and smoothing tools, but these are not particular strengths of the program.

DeltaGraph is the most full-featured graphing program currently on the market for the Macintosh. It is easy to learn and use, logical in its design, strong in the features it offers, and a good value. I had fun playing with this program and I have few criticisms of it. The color graphs you can create with it are impressive and versatile.

—Barrie Sosinsky

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Statistical Analysis Software

SUPERANOVA 1.01

Pros: Complete package for ANOVA and related tests; capable set of chart-enhancement tools, Do-It files, and other Mac interface novelties; direct links to StatView. **Cons:** A mostly nongraphical approach to data analysis. **Company:** Abacus Concepts. **Requires:** Mac Plus; hard disk. **List price:** $495.

Every time you read that decaffeinated coffee is raising your cholesterol level, or that fireplace bricks are leaking cancer-causing gas into your house, or that tutoring doesn't raise SAT scores, you are looking at the summary of an ANOVA (analysis of variance) study. Although the relationship between cause and effect is frequently another matter, the establishment of at least a connection between factors and effects is the domain of ANOVA and similar statistical procedures.

Abacus Concepts is justified in calling this program SuperANOVA. It offers not only an encyclopedic collection of standard methods in statistical inference, but also one of the slickest interfaces to be found on any Mac product. To paraphrase Einstein, everything has been made as simple as possible, but no simpler. Abacus has clearly spent lots of time designing straightforward ways of operating this array of sometimes cumbersome traditional tests.

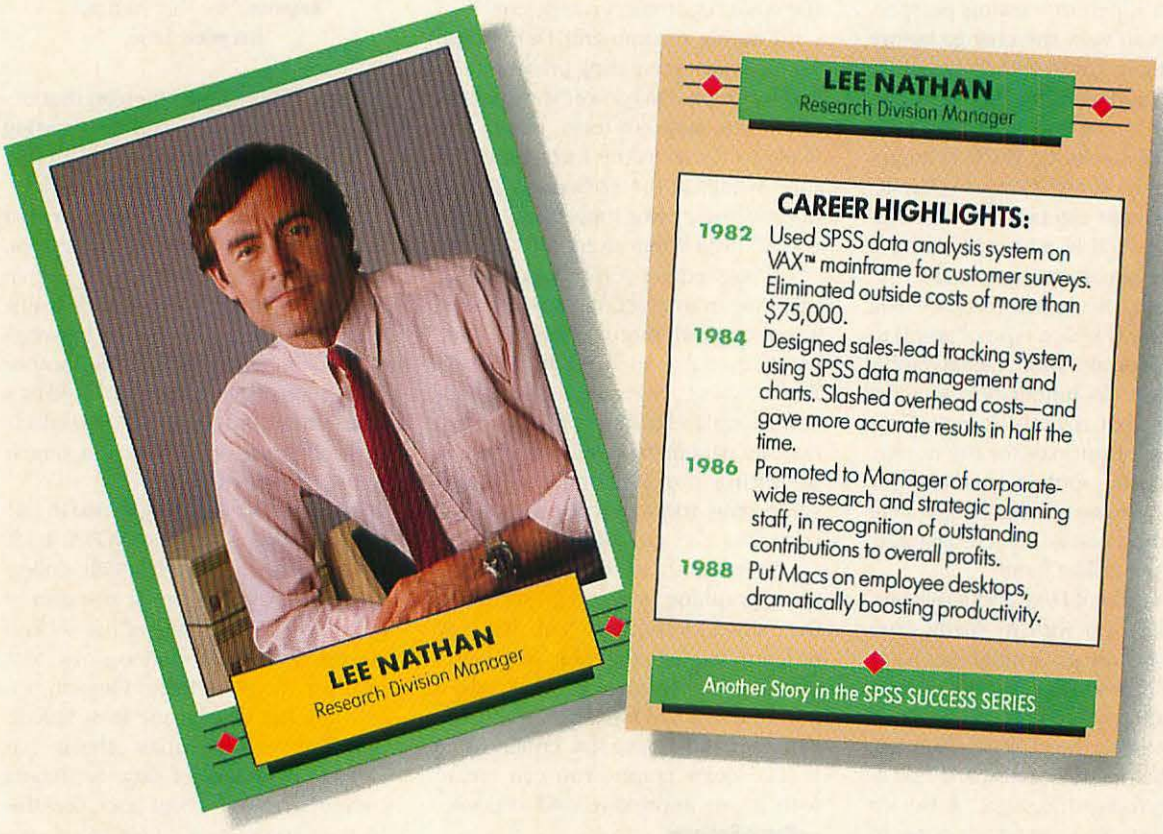
The Spirit of Professionalism

This package is designed for professional statisticians and researchers, and it approaches its task with commendable thoroughness. It includes ANOVA, ANCOVA, MANOVA, MANCOVA, and regression (simple, multiple, and polynomial). The program also reports all types of sums of squares, residuals, and the eigenvalues and eigenvectors computed during MANOVA.

SuperANOVA will accommodate models as large as memory permits. But be warned that if you use SuperANOVA with only 1MB of RAM, these models will be quite tiny—the appli-

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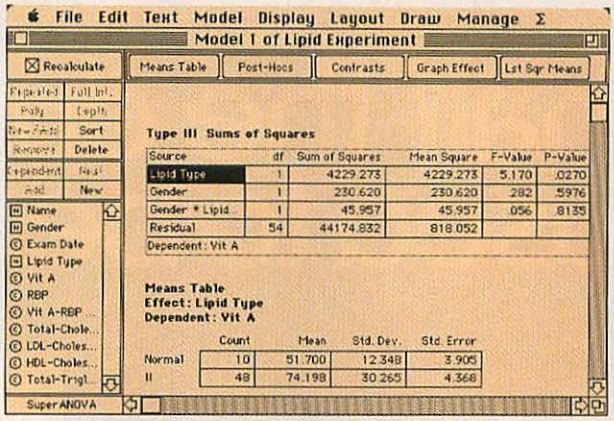
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Beautiful Models Inside
This screen shows SuperANOVA's highly optimized model-building interface. You can rapidly rearrange parts of a model in an interactive search for significant factors. ANCOVA and MANOVA models are equally easy to manipulate.

cation itself takes more than a megabyte and only works on a 1MB system through Abacus's ingenuity.

SuperANOVA handles a wide assortment of designs: block and incomplete block, Latin squares, nested designs, split-plots, designs with missing cells, and any conceivable repeated-measures design. The standard analysis window also includes buttons for post-hoc tests (12 of them, including the relatively new Games-Howell procedure) and contrasts.

Amenities

Using buttons for special tests suggests one of the principal differences between SuperANOVA and the general linear modeling section of giant statistical programs such as Systat. When you call up a data file to begin constructing a new model, all the data elements required for model construction are arranged with a few mouse clicks (see "Beautiful Models Inside"). The data elements appear in a list at the lower left of the screen. You simply select them and make a choice from the buttons at the upper left to identify elements of the model as dependent variables, individual factors, or interaction effects. This interface style means that you can construct a model with no more typing than it takes to label your data elements and enter numbers. As it happens, the program also provides a data entry environment that assists you in coding and formatting, and lets you import spreadsheet, database, StatView, and tabbed text files.

But the cumulative effect of dozens of thoughtful interface touches (the dialog boxes for recoding and transformation of data are exemplary) is simply to make it easier to construct models on the fly, to test and modify hypotheses, and generally to investigate data in an intelligent way. For example, Abacus Concepts' innovative Do-It file reconstructs all your work, not just the data set and last screen, when you choose Save from the File menu. In practice this means you can reconstruct the entire trail of refinement toward development of a final model.

For those just learning about model construction, Abacus has packaged 24 models, covering different formats in one-, two-, and three-factor ANOVA; repeated measures tests; Latin squares; and others. The manual not only carefully explains the use of models, but also details the computational methods the program employs.

To enhance the bare statistics for reports, Abacus offers the tear-off drawing tools it developed for StatView II, and some convenient SuperANOVA-specific touches. All output tables can be handled as objects, sized, font modified, and emphasized with the drawing tools before export to a word processing program.

A Two-Dimensional Picture

There is no doubt that SuperANOVA is the outstanding Mac vehicle for performing most varieties of analysis of variance and presenting the results of the analysis in reports with enhanced tables as their principal mode of decoration. One sometimes feels uncomfortable, however, with the program's firmly unmodern approach to data. Now that rotatable three-dimensional data plots with all manner of brushing, slicing, and data coloring have become common ways of looking at data on the Mac, it's possible to argue about the best way to perform exploratory surveys of a data set in the search for connections. Nonetheless, once a model has been selected, it's fair to say that most statisticians would regard SuperANOVA output as more convincing final support for a model than a set of 3-D color-plot views.

Buy It

If you work with statistics professionally, buy this program. It doesn't do everything, but it does ANOVA superbly. It's easy to think of individual research projects or consulting assignments in which the time savings and report quality of SuperANOVA would justify its purchase. You will probably want to own programs that highlight visual analysis of data as well, and you are likely need programs that include other types of statistical tests, but you won't regret having this one in your repertoire.—**Charles Seiter**

See* Where to Buy *or circle 846 on reader service card.

Application Generator

CAUSE 1.0.4

Pros: Easy to learn for a programming environment; supports multiple windows; provides access to a number of key Macintosh user-interface elements. **Cons:** Printing manuals is time-consuming; no access to external functions; structure of large applications can be difficult to follow. **Company:** Maxem Corporation. **Requires:** Mac Plus. **List price:** Version 1.1.1 Mac Personal version $295; Mac/DOS combo $495; Mac Professional $795 (unlimited run-time distribution); Mac/DOS Professional $1295 (unlimited run-time distribution).

How would you like to own a program to end all programs? Back in the seventies, a product optimistically named The Last One made that claim. A number of variations on the theme continue to appear on dealers' shelves. The packaging of Maxem's Cause, for example, reads "And the results are immediate: Programs that fit your business perfectly, created in less time than it would take to choose a ready-made

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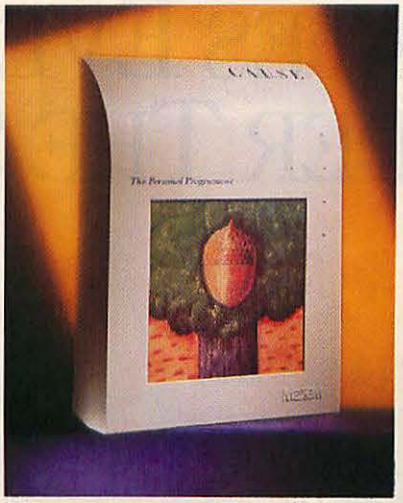
package. You'll never buy expensive, off-the-shelf software again." As a former professional programmer I tend to view such claims with skepticism. Still, Maxem makes some modest but perhaps significant contributions.

For example, programs generated with Cause run not only on the Mac but on mouse-equipped IBM PCs and compatibles under MS-DOS. Cause includes a relational-database engine to speed and simplify the design of data-intensive applications. And Cause has one feature I've never seen before: when you've finished designing a solution with Cause, the application generator automatically writes a user manual! Even many high-priced programmers and consultants can't make that claim.

Very High-Level Programming

Cause, like most application-generating programs, is really a high-level programming language coupled with a database engine. Applications as diverse as HyperCard and 4th Dimension also fit into this category, but Cause has several distinguishing characteristics. Most notable is that programming in Cause is modal: Cause leads you, step-by-step, through the programming process. Unlike HyperCard, which simply presents an intimidating blank screen when you want to create a script, Cause prompts you to choose or create a resource such as a window or a report, then asks you to define how that resource will respond to each possible action, and to choose what help information should be available online for that resource. At each step there are only a few possible choices, each explained by a context-sensitive help feature (see "Making Connections"). This limited selection keeps the Cause programming process easy to understand.

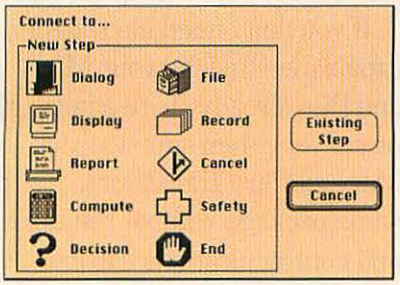
Make no mistake, however good Cause might be at hand-holding, programming in Cause is still programming. You'll probably have to read the manuals, which, fortunately, are pretty good. You also need a basic understanding of the problem you are trying to solve and how to apply Cause's tools to the solution. Advanced planning is necessary too; Cause can't make aesthetic decisions about how windows should look, nor can it divine what



MARK JOHANN

functions and operations you will need. Cause helps flatten the learning curve, but programs will inevitably still have bugs and bombs. While Cause has single-step and trace modes to help find bugs, debugging a program is never a pleasant experience. In some ways Cause's highly modal approach hurts here; I found it easy to get lost inside complicated programs, and there is no simple way to get a good overview of a program's structure. If I had to develop a large, complex program using Cause, I would definitely want more sophisticated debugging tools, like breakpoints and variable traps, along with a way to view the overall structure of the program.

Assuming that you succeed in learning to program—and Cause certainly makes learning easier than most programming packages—what can you do with Cause? Well, you can create programs that look and feel a lot like conventional Macintosh programs, though they do tend to have a certain Cause flavor because the Cause environment encourages the use of sequences of different single-function windows, rather than the modeless, all-at-once approach that typifies Macintosh applications. Once debugged and compiled, the programs can be run using the Effect run-time environment on either Macs or PCs. Maxem Corporation even evaluates applications sent to it and will market selected packages, called Effects, and pay the creator a royalty.



Making Connections

Cause takes you through the programming process one step at a time by predicting the responses of different actions.

Cause will handle a number of relational database–type tasks and put a nice user-friendly shell around them. Although this is adequate for a remarkable number of small business applications, Cause applications must still operate within some rigidly defined boundaries. Cause does not offer any mechanism for bringing in externally defined functions like HyperCard's XCMDs and XFCNs. Tasks that are not supported by Cause's built-in functions—for example transferring data over a modem or network, interfacing to special hardware, or importing or exporting exotic file formats—cannot be smoothly integrated into a Cause application.

Documentation by Design

The manuals that Cause generates are simple in concept. They consist of a title page, table of contents, some introductory material, and a reference section with an icon representing each resource along with the online-help text for that resource. If the text is carefully composed, the resulting manuals can actually be pretty good. Unfortunately they can take a very long time to print, and there is no provision for exporting a manual in a word processor format for editing, indexing, and so forth.

Cause is not the last word in programming tools. It won't replace programmers, or save you thousands of dollars worth of software. Nor will it make an instant programmer out of someone who doesn't have the time and inclination to carefully craft solutions to complex problems. Inflated claims aside, Cause is a nicely produced, well-thought-out tool that gives a broad range of users access to custom programming with a minimum of training.—**Ron Risley**

See **Where to Buy** *or circle 713 on reader service card.*

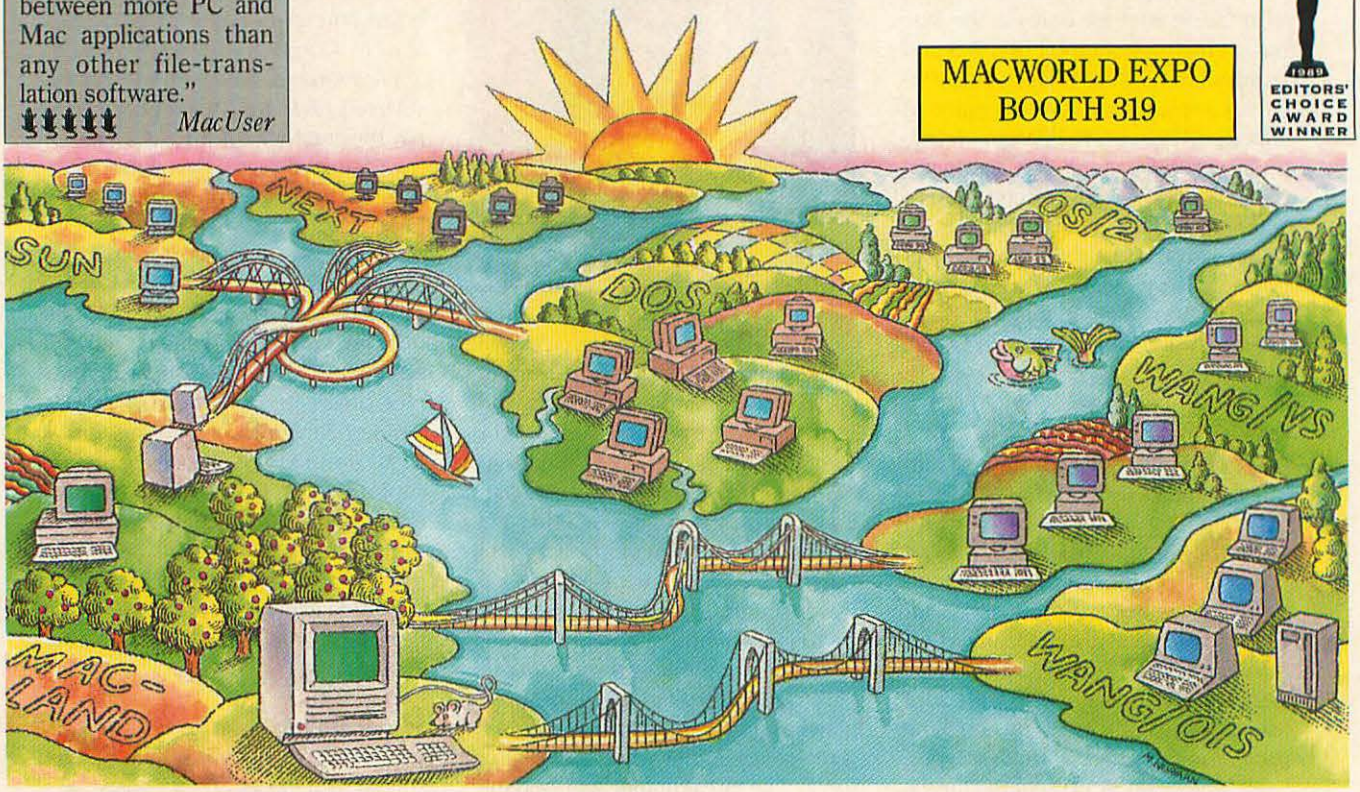
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Symbolic Mathematics Program

THEORIST 1.01

Pros: Compact yet feature-packed; best interface to a math program yet produced; complete; easy-to-use graphics and animation. **Cons:** Lacks macros or other programming constructs.
Company: Prescience Corporation.
Requires: Mac Plus. **List price:** $379.95.

$e^{2\pi i}$ Theorist is the latest attempt to bring several decades of computer-based symbolic mathematics expertise to the Macintosh. Like Paracomp's Milo, Theorist was written specifically for the Mac and features an attractive WYSIWYG interface. Like Stephen Wolfram's Mathematica, Theorist includes 3-D color graphics, a library of special functions for mathematical physics, and PostScript output.

Math WYSIWYG

Theorist tries to be complete, efficient, compact, and easy to use, and comes very close to meeting each of those four goals. First, the program's library of functions is respectable, even in such elevated company as Mathematica, or Maple from Canada's University of Waterloo. (For more about math programs see "Math without Tears," January 1990.) Besides the usual transcendentals and integration and differentiation rules, Theorist includes Bessel, Gamma, error, Legendre, Zeta, and Chebyshev functions; Laplace transforms; and matrix operations. Second, although Theorist mobilizes most computations with decent speed, its algorithms in many cases are not competitive with programs evolved through years of research-based refinement. Third, the program is admirably compact—the basic version runs nicely on an unmodified Mac Plus. The Mac II version, which takes up only 510K, takes advantage of the 68020 or 68030 CPU and a 68881 or 68882 for enhanced graphing and manipulation speeds. Theorist accomplishes this feat by using a relatively small algebraic engine and requiring you to load most special-purpose rules as you use them. Finally, this is without question the easiest symbolic math program to use. I was able to run through a standard set of reasonably complex problems without consulting any documentation for this review. Furthermore, the documentation, when needed, is cheerful and direct, and Prescience's technical support staff knows the program inside and out.

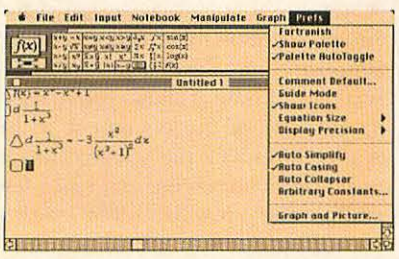
Plus

Theorist has enough horsepower to satisfy the needs of most users in science and engineering—with the exception of those who are directly involved with research in mathematics or mathematical physics. Not only is equation entry as convenient and direct as anyone could wish, but graphing functions are intuitive and the graph-manipulation icons are self-explanatory (see "Easy Entry"). Shading, coloring, and translucency effects; solid versus wire-frame modeling; and PICT or EPS output options all mean that you can obtain and print positively lurid visuals to accompany your calculations. You can also animate graphs effortlessly; pick a variable to be animated and watch your plots undulate. Another plus for Theorist is its implementation of one of Mathematica's best features, the Notebook file-maintenance style with built-in outlining.

Minus

Theorist is an excellent program, but Macintosh users with modest requirements or, conversely, with research careers in mathematics may want to look elsewhere. It's more than you need, compared to PowerMath II or Milo, if all you are looking for is help with calculus. It lacks the resolutely encyclopedic scope of Maple, and also provides no equivalent of the built-in general-purpose programming capability and algorithmic sophistication of Mathematica. Here's one example of this last point: expanding the fraction $\frac{1}{(1+x^3)}$ as a Taylor series in Theorist on a Mac II takes 3 minutes and 20 seconds, assuming you have asked, through a dialog box, for a series extending exactly to the 6th power in x. Mathematica takes 0.17 seconds. It's clear that Mathematica performs this particular expansion using an optimized algebraic division rather than tediously grinding through symbolic derivatives and evaluating them. But the bright side of this situation is that you can do the evaluation instantly in Theorist simply by calling Taylor from the Manipulate menu, whereas in Mathematica you need to follow the manual closely to get the right orthography for the Series command.

Theorist's most serious deficiency is its lack of a facility for batch-organization of computational tests. It's probably too much to expect a program of this size to incorporate the programming flexibility of Mathematica's giant command set (including LISP, C, BASIC, PROLOG, and FORTRAN), but even a modest implementation of macros with an IF-THEN construct would significantly extend Theorist's usefulness. The program would also benefit from at least skeletal online help.



Easy Entry

Theorist allows you to enter WYSIWYG equations two ways: through a symbol palette like that in Prescience's equation editor Expressionist, or through a traditional text-input mode, called Fortranish in the Prefs menu. With some practice, the palette-based entry mode becomes remarkably rapid.

Sum

In terms of interface design, Theorist is the best Macintosh symbolic math program—perhaps, in fact, the only good one. In areas such as number theory, special functions, and logic programming it can't compete with larger programs, but its unarguable superiority of interface makes it the easiest serious math program to operate, and its modest size makes it usable with relatively humble hardware. For mainstream science and engineering practice, Theorist will likely be the program that finally brings the advantages of symbolic computation to the average Macintosh user.

—Charles Seiter

See **Where to Buy** *or circle 847 on reader service card.*

Scanners: Handheld and Sheetfed

THE COMPLETE HALF-PAGE SCANNER/400

Pros: Excellent third-wheel design provides great scanning stability; intelligent. **Cons:** No gray scale; only scans up to 4 inches wide. **Company:** The Complete PC. **Requires:** Mac Plus. **List price:** $499.

THE COMPLETE PAGE SCANNER

Pros: Smooth, reliable, no-surprises operation; fast; inexpensive. **Cons:** No gray scale; only scans single sheets. **Company:** The Complete PC. **Requires:** Mac Plus; 2MB RAM. **List price:** $1199.



MARK JOHANN

The Complete Half-Page Scanner/400 (left) has a third roller that makes straight scanning easy. The Complete Page Scanner (right) produces crisp, high-quality scans.

With little fanfare, The Complete PC has just brought down the cost of high-quality scanning by introducing a 400-dpi hand scanner and an amazingly compact 300-dpi sheetfed scanner. Although neither one records gray scale, both devices have been designed extremely well and come with fuss-free software.

One in the Hand

Like other Japanese-made hand scanners, such as the LightningScan and ScanMan, the Complete Half-Page Scanner betrays its IBM PC–market origins: there's no Mac screen-resolution setting (72 dpi), and the 400-dpi setting is irrelevant for most Macintosh printers. Like all of these handheld scanners, The Complete PC's hand scanner is also limited to scanning a 4-inch swath.

Unfortunately, most hand scanners track their own movement across the page by sensing the rotation of two rollers on the bottom of the unit. While these rollers are very accurate, they render the hand scanner unusable for tasks where alignment is important—it's virtually impossible to keep the scanner absolutely straight as you drag it across the page. The round-edged cases don't help much because there's no perpendicular plane against which you can position a ruler as you drag.

Thunderware now makes a plastic extender that clips onto these two-roller hand scanners and provides a straight edge. But The Complete PC's hand scanner offers a far superior solution: a third roller at the heel of the device that allows you to literally push the scanner with a single finger in a very straight line. This third roller is something like the third leg of a camera tripod, a crucial element that elevates the device from a gadget to a professional tool.

Rolling Onward

The Complete PC's hand scanner produces extremely crisp, high-quality scans. Because it's not a gray-scale scanner, it works best with line art. If you do want to scan photos, however, the scanner offers a choice of three dither patterns. The spiral pattern produces the best printouts of scanned documents, and the mesh pattern is preferable for screen display, although this information doesn't appear in the manual.

The software provided with both scanners is thoughtfully designed and strikes a comfortable balance between simplicity and flexibility. Like most scanner software, it allows you to specify the size of the document to be scanned, displays the scanned image in progress on screen, and has a few rudimentary MacPaint-like editing tools. You can save the document in PICT, TIFF, MacPaint, or EPS formats. Given the effectiveness of the total package, together with the thoughtful design of the unit (and the company's promise that new, gray-scale-generating software is on its way), this half-page scanner appears to be the hands-down favorite.

Page Boy

The Complete Page Scanner is a fax machine–size unit into which you feed one loose-leaf page at a time. If you can accept not being able to scan pages from books or magazines—unless, of course, you tear them out first—then you'll be pleased with this sheetfed scanner's behavior. When you feed it a piece of paper, it gently pulls the page in a fraction of an inch and then dutifully waits for you to make your dither-pattern, dots-per-inch, and scan-size settings.

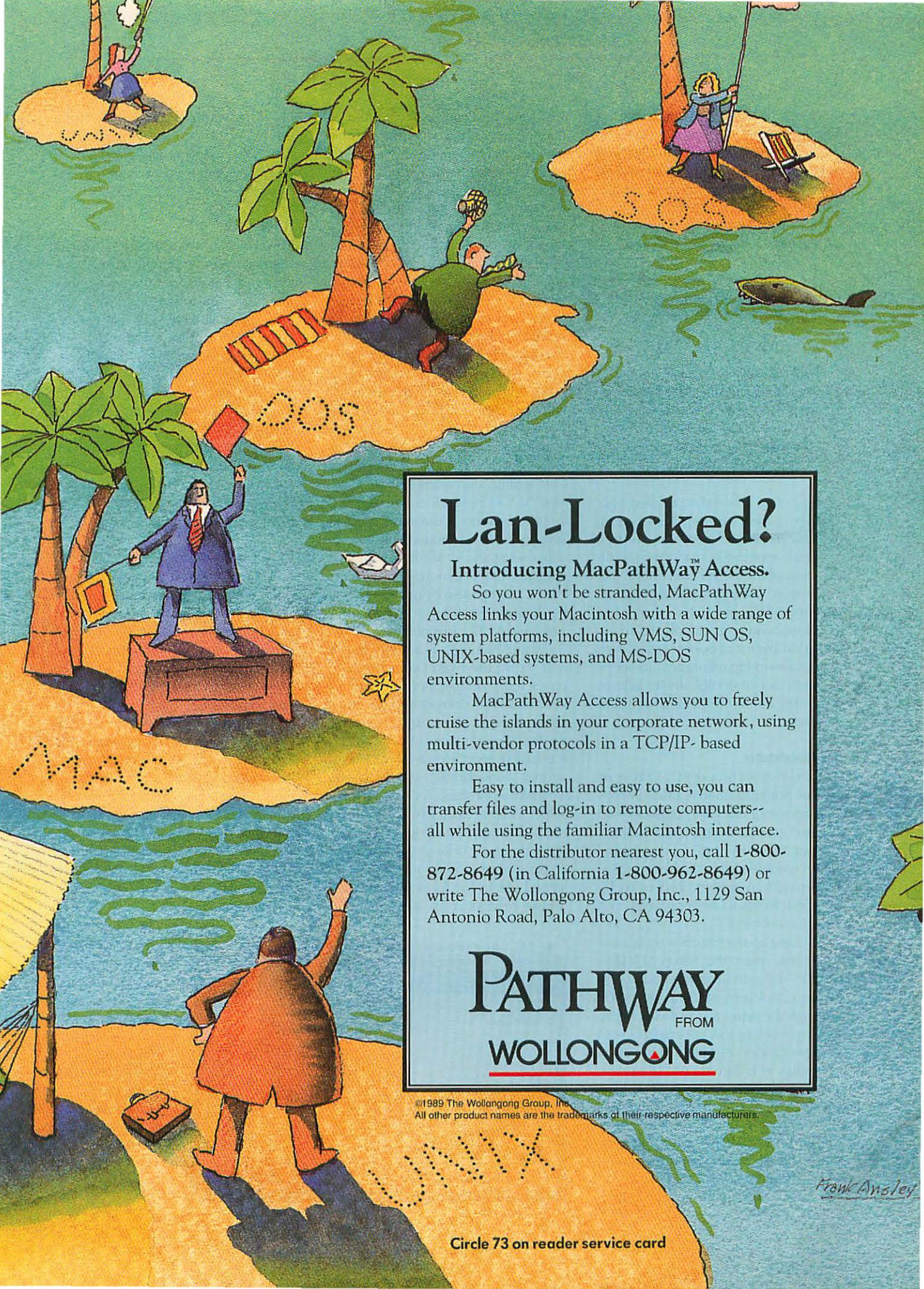
Sheet Speed

The process is brisk, particularly if you turn off the option that displays the incoming picture as the paper goes through the machine. A letter-size sheet takes about 18 seconds to scan with the option turned off (otherwise it can take about a minute).

Even if this sheetfed scanner were not compact, simple to use, and fast, its under-$1000 street price would still make it an important player in the scanning market; it's the only scanning option between the $500 hand scanners and the $2000-to-$4000 flatbed scanners. It has the same line art and dither-pattern capabilities as a hand scanner, while its ability to scan a full page at a time makes it a good low-cost bet for optical character recognition. The Complete PC hand scanner could also function with OCR programs that import TIFF files—as long as the text you're scanning is less than four inches wide.

In short, a great deal of care has

(continues)



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Frank Ansley

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obviously been lavished on these scanners, which are admirably characterized by sensible design, simplicity of use, and low cost. Neither package will floor you with technological dazzle, but both of them will earn your respect.—**David Pogue**

See **Where to Buy** *or circle 715 on reader service card.*

Accounting Program

M.Y.O.B. 1.0

Pros: Full featured; outstanding value; excellent Administration segment.
Cons: No integrated payroll segment; some procedures awkward.
Company: Teleware. **Requires:** Mac Plus; hard disk. **List price:** $99.

Can a bookkeeper find happiness keeping books using Teleware's $99 accounting software application that claims to offer equivalent power and more features than programs costing a good deal more? Yes, if you have just a few employees on your payroll and maintain a simple set of books. Probably, if you're a working manager who keeps a simple set of books on the side or who has someone seeing to them part-time.

The Administrator

The main attraction of M.Y.O.B. is its unique Administration segment, which manages your calendar, keeps a to-do list, and even gives you up-to-the-minute notices of overdue and discounted bills, customers' overdue receivables, recurring transactions, orders to be shipped, items to be reordered, and overdue contacts.

Setting up the system is really easy. After you select the Setup M.Y.O.B. icon in the Administration submenu of the main screen, M.Y.O.B. walks you through the setup process with an on-screen checklist that coordinates with the program's 240-page manual. A hard disk is required, and the documentation advises you to allow at least 2 megabytes for the program and data files. Teleware offers free telephone support for 30 days following purchase, and extended support is available at additional cost.

After setting up the general ledger, you then proceed to set up the accounts receivable, accounts payable, and inventory segments. M.Y.O.B. generally offers the same features and reports found in higher-priced programs, such as A/R credit-limit warnings, partial payments, invoicing and statements; A/P partial payments (which use open invoice tracking), credits, and late charges or discounts; password protection; and budgeting. The Inventory segment (also offered in the high-end programs like MultiLedger and Simply Accounting but not in Business Sense and At Once) has weighted average or LIFO inventory costing, salesperson and commission reports, and sales reports. M.Y.O.B. also offers reports not available in some higher-priced programs, such as inventory reports on best-selling and worst-selling items. And M.Y.O.B.'s general ledger accounts, vendors, customers, and inventory items are limited only by available disk space. In addition, M.Y.O.B. supplies sample general-ledger charts, which you can use or modify: Checkbook Business, Sales & Service Business, and Money Business.

Using M.Y.O.B. is simple and direct. From the main Command Centers screen, you click once on the account segment you want to use, and a submenu appears on the screen with the functions arranged like a flowchart. It is easy to see the order in which you should work through the processes. To make a purchase, for example, you select Purchases & Payables and the menu appears on the right. To generate a purchase order, you select Purchase Orders and fill in the well-designed electronic form. You can also access reports from the same Purchases & Payables submenu or from the Reports menu. Using the Sales & Receivables, Inventory, and General Ledger segments is just as simple and direct.

The Card File

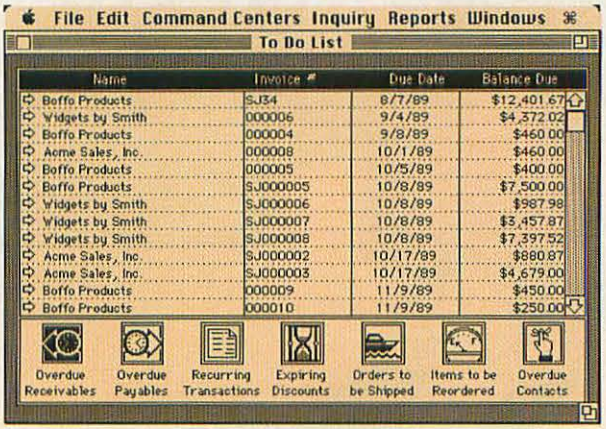
The Card File, accessed from the main Command Centers menu, is like a comprehensive Rolodex for storing information on customers, vendors, employees, or anyone you deal with. It supplies contact records for each person in the file, so you can record your activity. And it supports not only follow-up with vendors and customers (because it is automatically integrated with the To Do List), but also time billing. You can have a modem dial any number listed in the Card File, and you can use the Card File to sort entries for mail-merged letters and to produce mailing labels.

M.Y.O.B. by Comparison

M.Y.O.B.'s major drawback is that it does not have an integrated payroll segment, so you must either calculate and create your checks manually (a procedure covered in the manual) or use a separate application and then input the data into the M.Y.O.B. General Ledger.

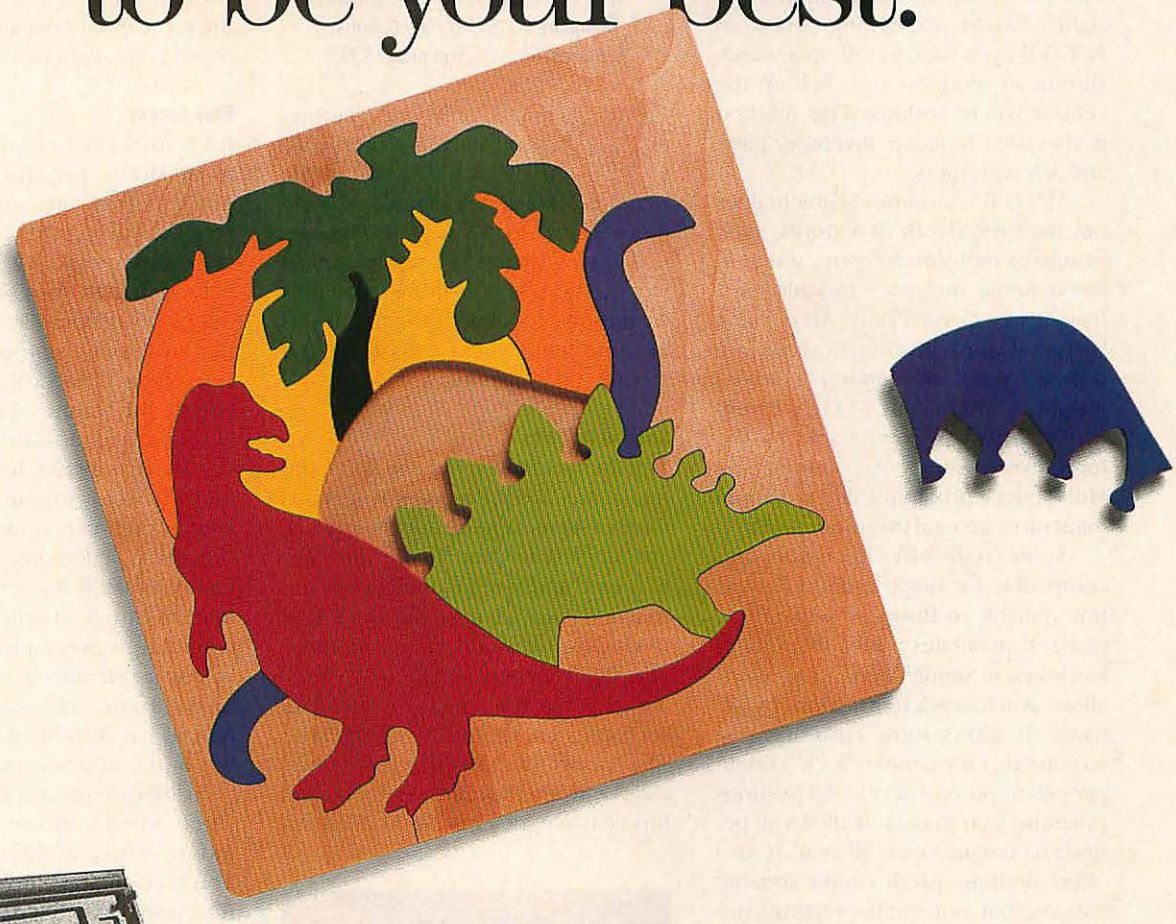
M.Y.O.B.'s card file–oriented database can be awkward at times. For example, to pay bills in A/P, you can't just call up your bills and select payments. You must search for each vendor in the Card File, and then, after the unpaid invoices are retrieved and displayed, pay each one separately. There is no simple batch process to pay all bills with discount due, for ex-

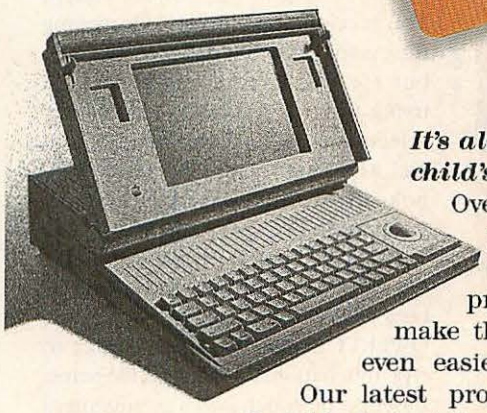
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First Things First
By clicking the icons along the bottom of the screen, you can easily see which invoices need your immediate attention. Selecting Overdue Payables, for instance, allows you to pay them directly from this window.

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ample. Teleware should allow adding all open invoices to the To Do List, which currently allows payment of only overdue and discounted bills.

M.Y.O.B. lets you select 12- or 13-period fiscal years, but entering data in the 13th period is clumsy, requiring an asterisk to precede each entry date.

And to locate a vendor card, don't look for a slide bar under a revolving card file similar to those found in Insight's Expert Accounting Series. In M.Y.O.B., you have to call up a search (listing all vendors) and click on the vendor you're seeking. This method is also used to locate inventory parts and A/R customers.

M.Y.O.B.'s Inventory segment does not have the depth of features, such as subassembly breakdowns, found in freestanding inventory modules like Insight's or Great Plains' Accounting Series. If your inventory needs are complex, you'll still require a dedicated inventory module. M.Y.O.B.'s Inventory segment is comparable to the more costly Simply Accounting and MultiLedger programs, and it should meet most general inventory needs.

To its credit, M.Y.O.B. is network-compatible for single users, a feature not available in Business Sense or At Once. It maintains a jobs list, similar to the one in Simply Accounting, which allows you to track transactions by job name. It allows some customization so you can, for example, "lock" certain periods to prevent accidental postings since the system default allows all periods to remain open all year. It also offers multiple profit center consolidations, but not multicompany consolidations. And its on-screen checkbook reconciliation is among the best found in accounting programs.

The $99 Bottom Line

M.Y.O.B. definitely offers the features found in its higher-priced competitors, except for complex, specific accounting needs and payroll. M.Y.O.B.'s best feature—not offered by any other program—is the excellent Administration segment. M.Y.O.B. is also as easy to use as its higher-priced competitors, except for a few things such as bill payment. M.Y.O.B. does indeed provide an outstanding bundle of features for just $99.— **Alan L. Slay**

See **Where to Buy** *or circle 816 on reader service card.*

Remote-Control Keyboard/Mouse Unit

REMOTE MOUSE

Pros: Nothing to install; requires no special software; works at distances up to 50 feet and angles up to 45 degrees. **Cons:** Text entry and fine mouse movements difficult; nonstandard keyboard arrangement. **Company:** Forté Communications. **Requires:** Mac SE. **List price:** $395.

There's only one remote-control Macintosh keyboard on the market. Called the Remote Mouse, it looks like the remote control for a fancy TV. The idea is that you can give a presentation or lecture, and as you move gracefully around the room with the touch pad in your hand you can control the mouse and even enter text.

Some of Its Parts

The Remote Mouse has two parts: the transmitter and the receiver. The transmitter's 40 rectangular rubber buttons are labeled in blue for letters and numerals and in red for functions. The functions include cursor-control keys (including Click and Drag), modifier keys (Shift, Option, and ⌘), and a helping of some basic menu commands such as Open, Close, Copy, and Paste. The special Jump key toggles the buttons between their alphanumeric and function assignments. Six keys are assigned to the function keys on an extended keyboard, so you can use them to trigger macros of your own design.



MARK JOHANN

Remote Mouse from Forté

The receiver is an unobtrusive black plastic box about the size of a deck of cards that you position on or near the Mac.

The most impressive thing about the system is its ease of installation. There are no power cords or SCSI connections involved. You simply plug the receiver into one of the Mac's keyboard ports. Batteries are included.

Easy Access

It's a stroke of brilliance that the Remote Mouse requires only standard Apple system software—the Easy Access INIT that comes on every Macintosh system disk. Easy Access (originally designed to allow one-handed operation of the Mac and manipulation of the mouse using the number keys on the numeric keypad) provides exactly the features a remote-control keyboard and mouse require.

There is a price to pay for relying on Easy Access to control your Mac. If you've ever experimented with this otherwise ingenious little program, you've noticed that precision mouse control can be cruelly tricky. As you continue to press a number key the mouse accelerates at a seemingly geometrical rate: after one second, the mouse has moved only a few pixels, but in the next second, it rockets off at an increasingly uncontrollable speed (even when you use the very slow mouse setting in the Control Panel). This acceleration is helpful for moving the cursor large trans-screen distances, but for small movements, such as trying to hit a window's close box or selecting a menu item, you start to feel as though you're trying to play polo out the window of a bullet train.

Entering text with the touch pad isn't too successful either. The alphabet keys are arranged, well, alphabetically, instead of in the familiar QWERTY layout, so don't expect to type much more than a short file name. Indeed, the touch pad's arrangement gives "hunt and peck" a whole new meaning.

Furthermore, you must switch back and forth between the touch pad's alphanumeric key functions

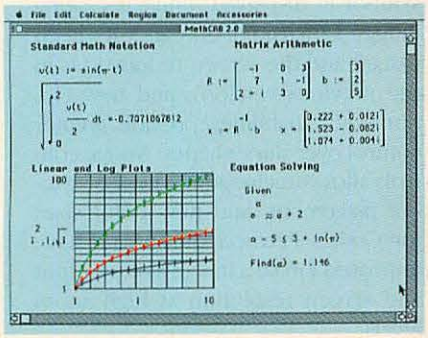
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After centuries of practice, mankind perfects engineering calculations: MathCAD.

Announcing MathCAD: A Calculating Renaissance For Your Mac.

What the historians will call it, only time will tell.

Perhaps the Century of Speed, or the Era of Ease. But whatever the name, this is the age of MathCAD, the only math package that looks and works the way you think.

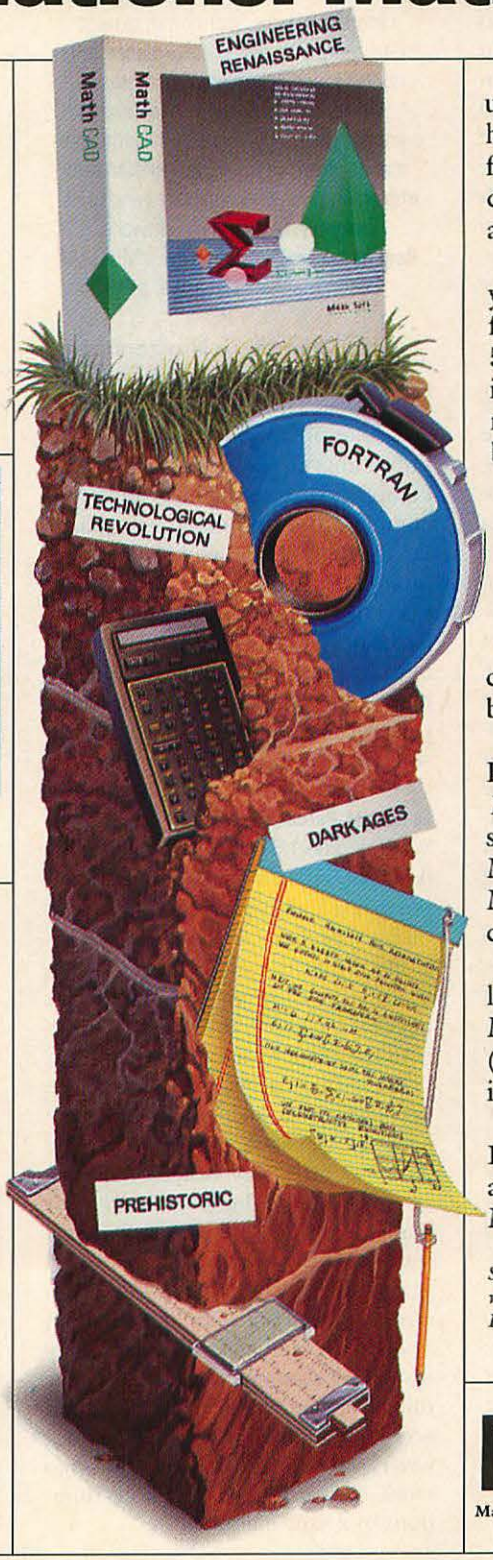


MathCAD takes full advantage of the Macintosh® interface, with features that make it simple to enter operators and Greek letters into equations.

MathCAD is the best selling math software in the world because it lets you perform engineering and scientific calculations in a way that's faster, more natural and less error-prone than the way you're doing them now–whether you're using a scratchpad, calculator, spreadsheet, or program that you wrote yourself. It gives you more control and more flexibility than ever before.

MathCAD's live document interface™ lets you enter equations anywhere on the screen, add text, and graph the results. Then print your analysis as a presentation quality document.

And it has over 120 commonly used functions built right in, for handling all kinds of equations and formulas, as well as exponentials, differentials, cubic splines, FFTs and matrices.



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Circle 34 on reader service card

(blue label) and its modifier key functions (red label) by pressing a special Jump button. In principle, this doubling up of key functions is an efficient idea. The problem is that you often use modifier keys like Shift and the spacebar in conjunction with alphabet keys, and you have to press the Jump button to go from one to the other. Thus, to type "No Go," you have to press a Jump-Shift-Jump-N-O-Jump-Space-Shift-Jump-G-O sequence—no small feat when in the midst of a presentation. And to type "J. Kander, C.P.A.," you'd have to rush up to the podium and pound on the real keyboard—the Remote Mouse, alas, has no period, comma, or other punctuation keys.

Out Standing in the Field

Except for the difficulty of precise mouse movements and text entry, the Remote Mouse is enormously successful. For example, it's terrific for controlling on-screen slide shows using presentation software such as Persuasion or Power Point. In those situations, you could make splendid use of the touch pad's function keys to set macros into operation—say, a bar-by-bar graph "build." Using the eight mouse-movement keys, you can manipulate the on-screen cursor enough for it to serve as a pointer. And the Open, Close, and Quit command buttons are always useful, but the Print command key seems silly, in light of the missing period key).

The Remote Mouse works well from angles as great as 45 degrees, and at distances of up to 50 feet; of course, both angle and distance measurements—and, in fact, the Remote Mouse itself—are only relevant if your Mac screen image is being projected. For some future version of the Remote Mouse, one might wish for a landscape orientation of the transmitter, thus allowing a QWERTY key layout, and some way to control Easy Access's rampaging-cursor syndrome. In the meantime, the Remote Mouse does precisely what it promises to do, and you'll have it working literally five minutes after opening the box. If strolling in the audience appeals to you, this is the (only) remote keyboard to buy.

—David Pogue

See **Where to Buy** *or circle 834 on reader service card.*

Music-Transcription and Publishing

FINALE 2.0

Pros: Transcribes music played on MIDI instruments; imports/exports MIDI files; symbols and libraries are user definable; can create very large scores; can extract parts automatically; precise placement controls; positions lyrics automatically.
Cons: Some operations needlessly complex; Cut, Copy, Paste, and Undo commands often not available; nonstandard implementation of dialog boxes and tools.
Company: Coda Music Software.
Requires: Mac Plus; hard disk. 2MB RAM recommended. **List price:** $749.



When Coda Music Software's Finale program was released in late 1988, it was touted as the solution to any desktop music-publishing problem, no matter how complex. The program was amazingly complete, but so cumbersome that all but the most determined of users were often left mystified—and unsatisfied. Coda has just released Finale 2.0, at a lower price than its predecessor, with new features, excellent documentation, and a look-and-feel that's a lot closer to what most users would consider Mac-like.

To Record, Perchance to Play

When Finale 1.0 was released, it lacked the type of editing commands and recording and playback options found on most professional sequencing programs. This prevented Finale 1.0 from being the only piece of software needed by many composers; its recording and playback capabilities functioned solely as ways to transcribe keyboard performances and provide playback for proofing purposes. Finale 2.0's new MIDI tool, however, is similar to (though slightly less elegant than) those found in many professional sequencer programs, and provides a graphic display of note velocities, durations, and controller information. There are commands for editing any displayed parameter, as well as for things like creating an audible crescendo by scaling note velocities upward over time, or making a passage more staccato by scaling note durations by a fixed amount.

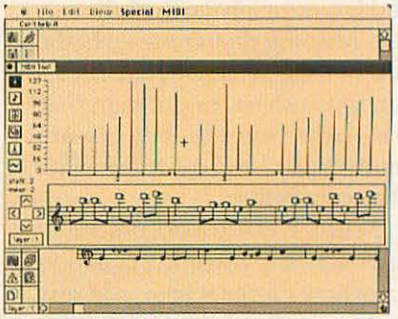
New MIDI Tools

Although some people will still prefer using a sequencer program as a recording and editing environment and using Finale to transcribe the finished product via the universal MIDI file format, Finale's new MIDI tool is invaluable for controlling articulation on playback. Other new playback controls enable you to immediately hear your music, through a MIDI device or Macintosh speaker, from any point in the score, while any tool is selected. You can also overdub additional tracks in the transcription window without manually loading a background file. Importing MIDI files from other programs no longer requires the separate Finale Utilities application, and Finale now exports MIDI files as well.

When moving or reshaping symbols such as slurs and crescendo markings, in version 2.0 the outline of the symbol is displayed while it's being dragged, instead of only after it's been placed and the screen redrawn (as in the previous version), and new Option-key capabilities provide greater control over slurs' shapes. Nudge controls allow precise adjustment of symbol placement, and new point sizes for Coda's Petrucci music font have improved Finale's ImageWriter output and screen resolution at high zoom levels.

If these seem less like innovations and more like fixes of irritating quirks in a program, it's because most of them are. Although Finale 2.0 is less cumbersome than the previous version, it still contains numerous small annoyances that make some of the most

(continues)



Finale's MIDI Tool

Selecting the MIDI tool and double-clicking on a measure brings up this editing window. Shown here is a display of individual note velocities, or loudness.

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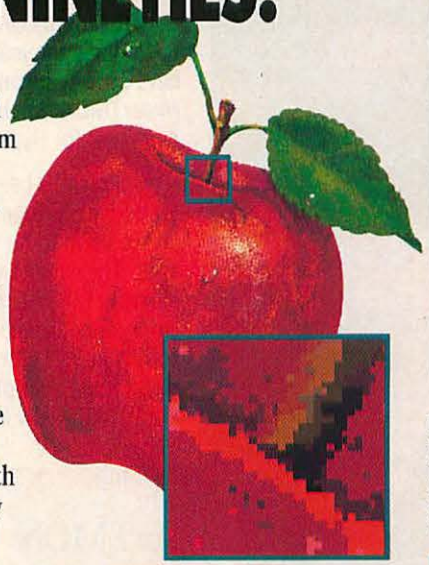
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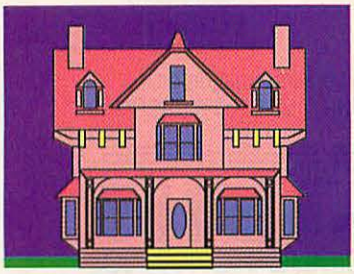
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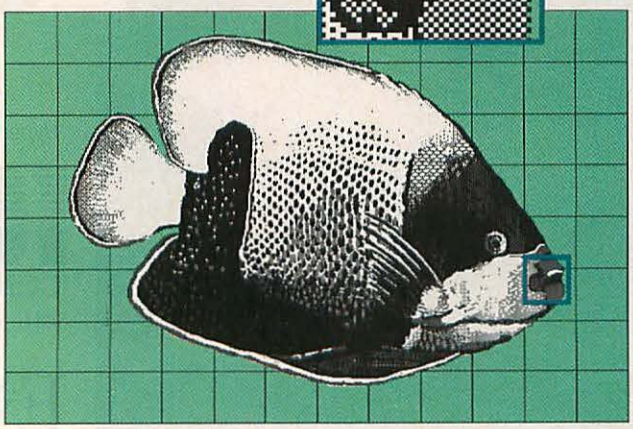
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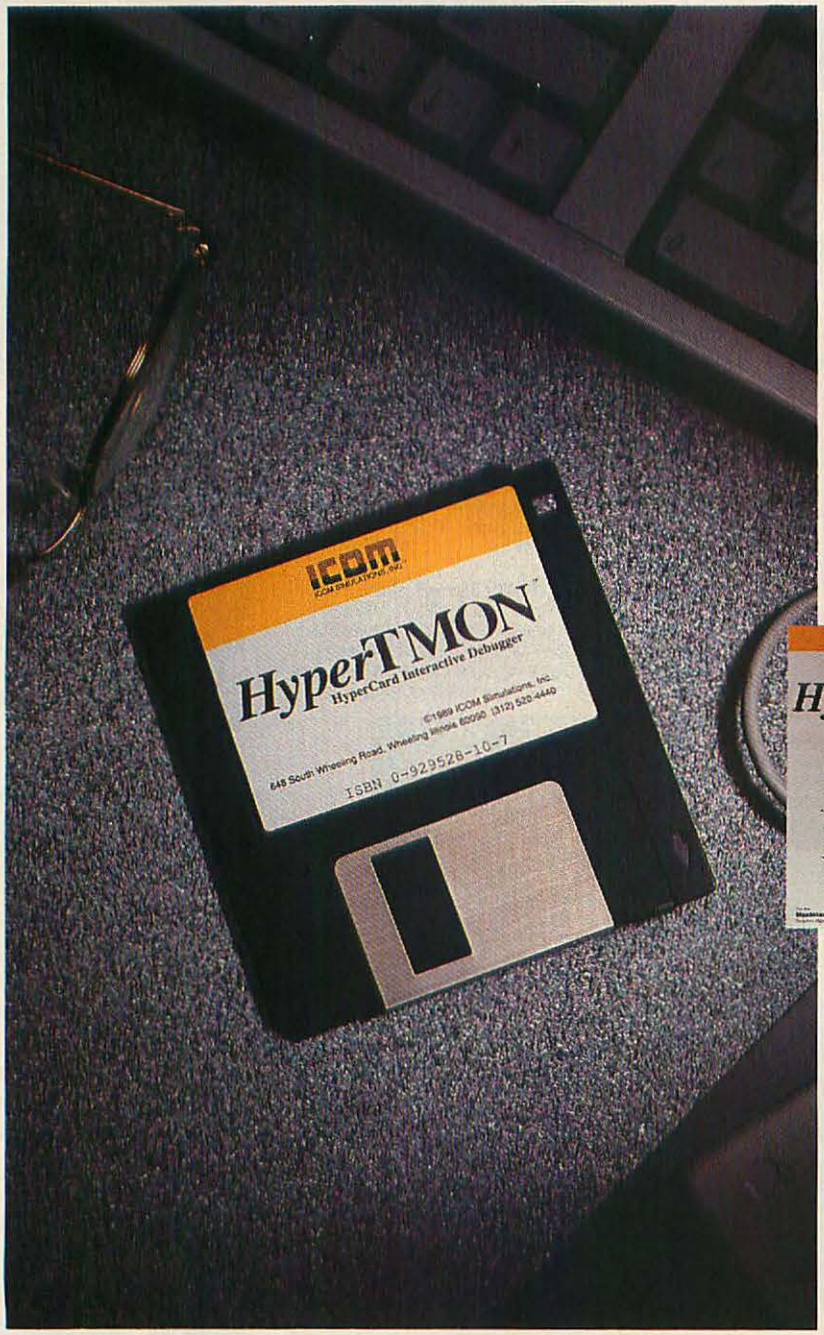
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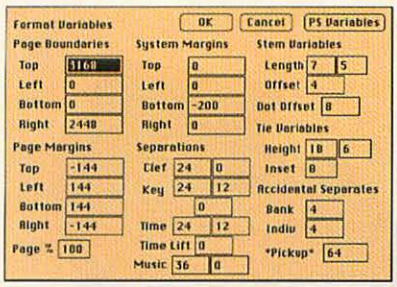
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Enigmatic Units

Choosing Format from Finale's Special menu brings up this dialog box, in which you set default values for page size, margins, and symbol spacing, all measured in EVPUs (Enigma Virtual Page Units). There are 288 EVPUs per inch. One would expect that the page size and margins would be adjusted using the Page Layout dialog box.

commonly used functions unnecessarily complex and/or slow. Coda could have paid greater attention to the design of the most-often-used features, and some of the more esoteric functions (such as the Shape Designer) could have been spun off to a separate application.

The Good News

If you need to see it on paper, chances are Finale 2.0 can print it. The program can create staves with more (or fewer) than 5 lines and provide control of beam and secondary beam breaks, and it supports alternate noteheads for percussion notation. Finale's Shape Designer window is really a miniature PostScript drawing program, and you can create your own libraries of the symbols you create with the Shape Designer. You can also define chord symbols by designing a symbol and then playing the chord you want on a MIDI instrument. Finale can also analyze the chords within a score and assign the appropriate chord markings to them automatically.

Each syllable of a lyric can be assigned to a particular note entry, and that syllable will remain properly placed under that entry throughout any editing operations. There are also commands to globally replace any font with any other, and lyrics can be copied and pasted from word processors. Finale has three types of lyrics—Verse, Chorus, and Section—which can appear in different fonts. Search and Replace functions can locate all occurrences of a particular rhythmic value that falls on a particular pitch, and are also useful for transposing all occurrences of a specific pitch to its enharmonic equivalent.

In short, Finale 2.0 offers a vast expanse of functions and commands that, if mastered, can produce precisely edited, high-quality printed scores, all the while providing live input and output via MIDI synthesizers.

And Now, Back to Reality

Even with the significant improvements of the 2.0 update, however, Finale is still a bear to operate. Many of the tools you need to use the most are tucked away in dialog boxes that are anything but obvious (see "Enigmatic Units"). Many nonstandard operations are needlessly complex, and Finale's departure from conventional implementation of Cut, Paste, and Undo commands seems unnecessary.

There are two reasons I can forgive most of Finale's faults: it does things that no other program can do, and it has extremely thorough and well-indexed manuals. Although they total over 800 pages, the manuals are clearly written; they are divided into three volumes titled Learning Finale, Finale Reference, and Finale Encyclopedia. After one afternoon with Learning Finale you'll be printing your first score, and by the time you reach the end of the tutorial you'll feel pretty handy with most of the entry and editing tools.

The Verdict

I recommend Finale 2.0, but only to those users who need the features that only Finale can provide. For anyone with less demanding needs, a look at midrange programs like Passport's Encore and Coda Music's MusicProse is a good idea. (MusicProse includes a subset of Finale's features, but with a more streamlined and altogether pleasant user interface. For more about MusicProse, see *Reviews,* April 1990.) The improvements in Finale 2.0 make it much more usable than its predecessor, and its excellent manuals make it much easier to learn. So if you need the ultimate in capabilities and are willing to sacrifice a little comfort and speed, consider Finale 2.0.

—Charles Clouser

See **Where to Buy** *or circle 728 on reader service card.*

AppleScanner Upgrade Kit

ABATON 8-BIT UPGRADE KIT

Pros: Scans from a desk accessory; independent horizontal and vertical resolutions; mirror and negative scanning. **Cons:** No gray-scale visualization or editing with Abaton Scan DA software; AppleScan software doesn't work with upgrade; Apple's HyperScan software functions poorly; halftone images can't be scaled when scanned. **Company:** Abaton, a subsidiary of Everex Systems. **Requires:** AppleScanner or Abaton Scan 300/S; hard disk; gray-scale monitor. **List price:** $595, bundled with ImageStudio or Digital Darkroom $100.

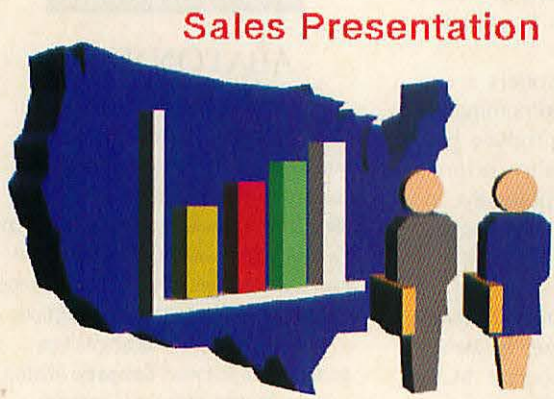


There was a time when 8-bit gray-scale scanners were an expensive luxury, and Apple's 4-bit scanner was more affordable and perfectly adequate for capturing images for use in HyperCard stacks or in documents destined to be printed on low-resolution printers. However, the 4 bits of information the AppleScanner records for each pixel in its gray-scale mode are only sufficient to produce pictures with 16 shades of gray. Until now, AppleScanner owners who wanted to get 256 shades of gray had no choice but to purchase an 8-bit scanner. Abaton's 8-bit upgrade kit for the AppleScanner provides a new alternative that, by means of a simple logic-board replacement, transforms the AppleScanner into a full 8-bit scanner.

When you purchase the upgrade kit directly from Abaton, the company makes arrangements for a third-party service technician to install Abaton's logic board in the AppleScanner at your business or home. Some dealers, too, are qualified to handle the installation. (You get to keep the original Apple logic board.) Installation voids the Apple warranty, but the upgrade includes a 90-day warranty on both Abaton's board and the remaining original AppleScanner hardware. Once the upgrade was installed, I found that my scanner took quite a bit longer to warm up. It took at least 20 seconds to warm up before I turned on

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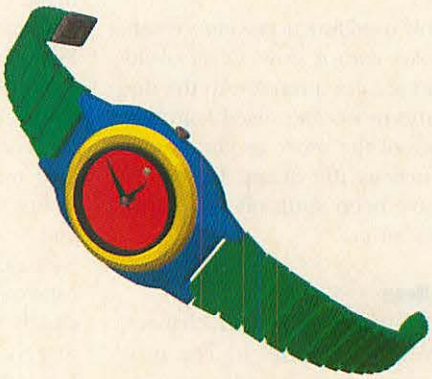
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the rest of my system in order for it to operate properly.

Abaton Scan DA

Abaton's upgrade kit comes with Abaton Scan DA, a desk accessory that enables you to scan images while you're working within another program. Scanning is controlled through a single, movable dialog box with an assortment of entry boxes, check boxes, slider controls, and pop-up menus. The boundaries of the region to be scanned can be specified by dragging and stretching a rectangle over a miniature preview of the image; alternatively, you can enter them directly as absolute coordinates in decimal inches.

Scan DA allows you to preview the image you are scanning, but once you've scanned the image, you can't crop or otherwise alter it. You can save images directly in TIFF, PICT2, EPS, or MacPaint format, but you can't scan them into the Clipboard or to a printer or other chooser device such as the AppleFax.

Although the software allows you to independently set the horizontal and vertical resolution of scans from 72 dots per inch (dpi) to 300 dpi in 1-dpi increments, it won't let you scale the scanned image. This means that you are limited to creating halftones that are the same size as the original picture. Without the scaling information, resizing these halftones within page-makeup programs results in ugly patterns. And HyperScan's ability to capture scaled, halftoned images is disabled with the upgrade. Other features of HyperScan do work with the upgraded scanner, but my scans of continuous-tone images lacked sufficient contrast, and I couldn't alter them satisfactorily from within HyperScan. A spokesperson for Abaton said that efforts are being made to rectify this problem.



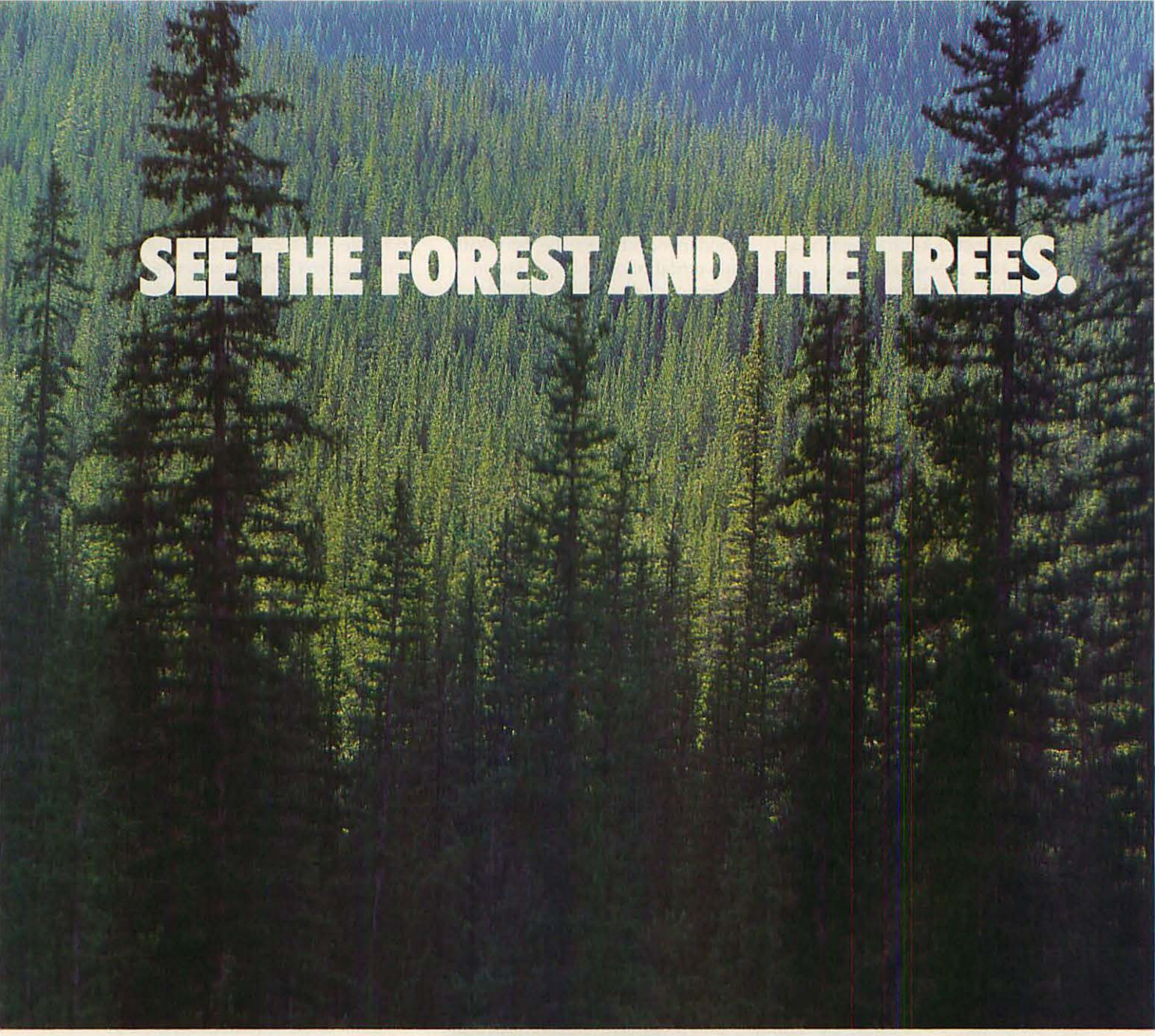
Shades of Sunset
The continuous gradient of gray in the sky of this sunset image needs more than 16 shades of gray to prevent its turning into a pattern of concentric bands. The original 8- × 10-inch print was scanned at 150 dpi (top) using AppleScan software with a 4-bit AppleScanner and (bottom) using Abaton Scan DA in 256-shade gray-scale mode with an upgraded 8-bit scanner. The image was rotated 90 degrees clockwise to match its landscape orientation, using image-editing software. The TIFF file for the 4-bit image was 919K and for the 8-bit image, 1758K.

Direct Drivers

The AppleScan software doesn't work with the upgraded AppleScanner, and it lacks many AppleScan features. For example, you can't automatically generate a test sheet by scanning a selected area repeatedly, using different contrast and brightness settings. You can change the contrast and brightness over a large range of settings, but you can't change the actual gamma curve. The biggest inconvenience, though, is that Abaton's software won't let you view or alter an image once you've scanned it. You have to use another application to open the disk file containing the scanned image. As a result, you're likely to find it necessary to make several scans and jump back and forth between the Scan DA and another application before you get an image just right. This process is simplified, however, by add-on drivers from Abaton that let you scan images directly from within ImageStudio and Digital Darkroom. ImageStudio's driver works well, but it took a lot more experimentation to get a good image with the Digital Darkroom driver than it did using Abaton's Scan DA. Abaton is aware of the limitations of the Digital Darkroom driver, and an improved driver should be available by the time you read this. You can buy either ImageStudio or Digital Darkroom software bundled together with the upgrade kit for an additional $100.

Using either the Scan DA or the ImageStudio scan driver, the upgraded scanner proved capable of yielding satisfactory scanned images with 256 shades of gray (see "Shades of Sunset"). The difference between a 4-bit image scanned with the AppleScanner and the same image scanned at 8 bits with the upgraded scanner is quite noticeable when the images are displayed side-by-side on a gray-scale monitor or printed using a high-resolution imagesetter. However, the differences are much more subtle when the images are printed as halftones using a 300-dpi laser printer. If you intend to use a laser printer as the final output device, you should first experiment with someone else's 8-bit scanner to make sure that the improvement is worth the effort and expense of upgrading the AppleScanner.

(continues)



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Abaton's 8-bit upgrade is a reasonable alternative, however, to ditching an AppleScanner for a more expensive 8-bit scanner. Just keep in mind that what you'll wind up with isn't an 8-bit AppleScanner, but an Abaton 300/GS scanner in disguise, and you'll have to get accustomed to using a different suite of scanning and image-editing tools to make full use of it.

—David L. Foster

See **Where to Buy** *or circle 702 on reader service card.*

PostScript Font-Design Software

THE ART IMPORTER 2.0

Pros: Makes it easy to produce high-quality custom PostScript fonts; imports graphics files from various sources. **Cons:** Font size (number and complexity of characters) limited by printer memory. **Company:** Altsys Corporation. **Requires:** Mac Plus. **List price:** $179.

FONTOGRAPHER 3.0

Pros: Good selection of drawing tools and character-design aids; useful autotrace feature; PostScript and screen font hints. **Cons:** Minor. Lacks tools for drawing ovals, squares, and rectangles in one step. **Company:** Altsys Corporation. **Requires:** Mac Plus. **List price:** $495.

Whether you need a way to add a few special symbols to text documents or you want to find a truly unique typeface to help set the tone for your organization, creating custom fonts may be the best path to typographic distinction. Altsys makes this option even more attractive by bringing major improvements to two already excellent PostScript font-generating programs. In some ways complementary, the pair offer very different methods for building custom fonts: by importing existing graphics, or by designing the characters yourself.

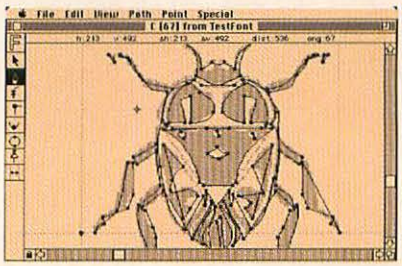
The Art Importer

Created with the typical Macintosh user—not the typographer—in mind, The Art Importer is certainly the more accessible of the two programs. Like its earlier rendition, The Art Importer turns almost any EPS or PICT graphics into custom PostScript fonts, and simultaneously generates the accompanying bitmapped screen fonts. Whether it's a set of company logos, a group of special scientific symbols, or a bunch of hieroglyphics, the graphics you use regularly become characters you can type right from the keyboard just like ordinary text. That way, you don't have to import, place, and resize a graphic every time you want the image to appear in a document—instead, just place the text-insertion point there and type in the graphic character.

This capability is especially useful when you're placing a symbol or picture directly within text, since matching the character to the size of the surrounding text is as easy as selecting the right point size from the appropriate menu. What's more, a graphic maintains its relative position as you edit text, and you can edit the graphics with standard text commands.

The transformation from graphic file to font character in The Art Importer couldn't be easier. For each new character, you just choose the keystroke you'll type to produce the graphic in the resulting font and import the graphic. During the import process, the program creates a bitmapped screen image of the character for each point size you've requested. These bitmaps can be a little rough, but you can then edit them with simple FatBits-type tools.

Once imported, a new character can be scaled, moved relative to the baseline within the font's character cell, or resized independently in either dimension. With the font complete, a quick Save As produces three disk files: an Art Importer file that you can reopen for future modifications, a screen font suitcase, and the PostScript printer font itself.



Font with Character

At the left is Fontographer's palette of drawing tools. The character outline shown was produced by Fontographer's autotrace feature from a bitmapped image.

Whereas the previous version limited you to 16 characters in a font, The Art Importer now lets you build fonts containing as many as 256, the Mac's maximum. The new release also imports color images from more programs and does so more reliably than the previous version (color characters can be separated by a professional printer, from PageMaker, FreeHand, and Illustrator output).

The only remaining limitations to The Art Importer are excusable. For one, the size of an individual character or an entire font can't exceed the memory available in your Mac or your printer (complete text fonts often do, so The Art Importer isn't recommended for text fonts). Also, you can't import bitmaps, since they don't belong in PostScript fonts. And while The Art Importer fonts still don't supply kerning information, there aren't too many situations where you'd need automatic kerning of a pair of side-by-side graphics.

Fontographer

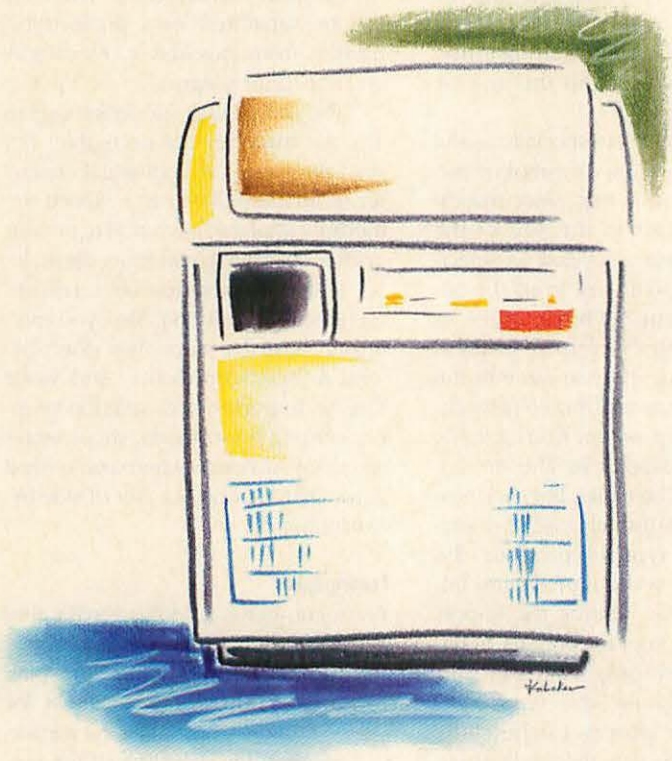
Fontographer is a professional's tool intended for designing new fonts from scratch. But whether you plan to develop fonts for sale or just for your own private use, the new version of Fontographer will smooth the mechanics of the font-development process considerably.

Like drawings created in Illustrator or FreeHand, Fontographer characters are composed of straight lines and bezier curves. In Fontographer, you determine precisely where the bezier points that define the curves go with a series of drawing tools. New to Fontographer with this release is a versatile pen tool that combines the functions of several single-function tools. However, Fontographer still doesn't provide a freehand tool—you must lay down the bezier points one at a time. And although there's a tool for drawing circles in a single step, the program lacks similar options for ovals, squares, and rectangles.

Font Design

Fontographer sets itself apart from

(continues)



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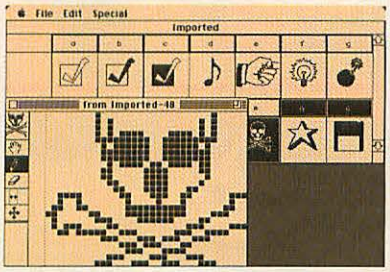
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Imported Fonts

The Art Importer's screen, showing a scrolling listing of the available keystrokes and a few already imported characters. Fontographer has a similar window.

other drawing programs with a top-notch collection of features for font design and generation. The main program window shows you an overview of the entire font, a grid of cubbyholes labeled with the bitmap character representing each keystroke. Each individual character occupies its own window, in which a nonprinting grid helps you to achieve consistent sizing and positioning of characters. You can also set up kerning tables for character pairs of your choice. When you're through defining characters, Fontographer manages the trick of turning them into actual printer and screen fonts.

The new autotrace function produces quick, faithful renditions of scanned characters (or any other bitmapped graphics, for that matter) in the form of Fontographer-editable character outlines composed of bezier curves. The accuracy of the autotrace feature is quite good, but you should expect to do a fair amount of touch-up editing on complex shapes.

Fontographer Hints

Until now, Adobe's PostScript fonts have always looked better than anyone else's on lower-resolution printers such as the LaserWriter, partly because of hints incorporated into the character definitions. Version 3.0 of Fontographer eliminates that Adobe advantage with hinting technology of its own. Fontographer adds its hints automatically, sparing you a painstaking manual process. Because the hinting is automatic, it affects all characters the same way, and you must use a uniform stroke width to get good results. For perfectionists who do wish to add hints character by character, Altsys sells a $200 hint-editor module.

Several less dramatic but appreciated enhancements combine to make the new Fontographer considerably more convenient to use. The program now lets you modify selected groups of characters by scaling, skewing, flipping, or rotating all of them by the same amount, instead of making these modifications one character at a time. The preview window faithfully reproduces an image of the actual PostScript characters. Earlier versions of Fontographer could generate screen fonts for you from the PostScript outline, but now you can optimize the screen bitmaps yourself with a built-in editor. Finally, Fontographer's screen fonts are now generated in Apple's new(er) and improved NFNT format, instead of the older FONT.

If you need custom PostScript fonts, your only alternatives, short of hiring an electronic-type designer, are The Art Importer and Fontographer. Fortunately, both are fine programs that will take you from concept to a printable font as quickly as your clip art library or design talents will permit.—**Steve Cummings**

See **Where to Buy** *or circle 710 (The Art Importer), 729 (Fontographer) on reader service card.*

Statistical-Analysis Software

JMP 1.01

Pros: Loads of power; flexible multipurpose calculator; journal feature for selectively saving results to a log file.
Cons: Some operations are difficult to abort; makes SANE-related errors on Mac Plus and SE; requires thorough knowledge of statistics. **Company:** SAS Institute.
Requires: Mac Plus. 2MB RAM and hard disk recommended. **List price:** $695.

The program SAS has long been known as *the* statistics package for professional researchers. It enables mainframe users to perform extremely complex analyses, but it also requires them to have intimate knowledge of statistics.

With JMP, the makers of SAS now offer Macintosh users a subset of that same power. And instead of taking the usual mainframe tactic of requiring you to preselect analyses and output options, JMP adopts a gentler approach. Once you've entered the data set into JMP's spreadsheet grid, you need only indicate the measurement class for each variable, select the variables that are of interest to you, and choose an analysis platform to generate a slew of useful graphs and statistics.

Analyses and Options

JMP's analysis platforms even relieve you of the responsibility of knowing what statistics you need or which ones are appropriate. All you have to do is decide generally how you want to look at the data. There are six platforms available:

- *Distribution of Y's* is used to examine individual variables and to display simple statistics and histograms.
- *Fit Y by X* looks at the relationships between pairs of dependent and independent variables.
- *Fit Y by X's* calculates multiple regression (the effect of a series of independent variables on one dependent variable), main-effects analysis of variance models, analysis of covariance, and analysis of categorical linear models.
- *Specify Model* produces a complex-model analysis of variance and lets you specify both the effects to be tested and the error terms.
- *Spin* shows data as a spinning 3-D display and allows principal components to be calculated.
- *Y's by Y's* shows relationships among all *y* variables using correlations, scatterplots, and plots of outliers.

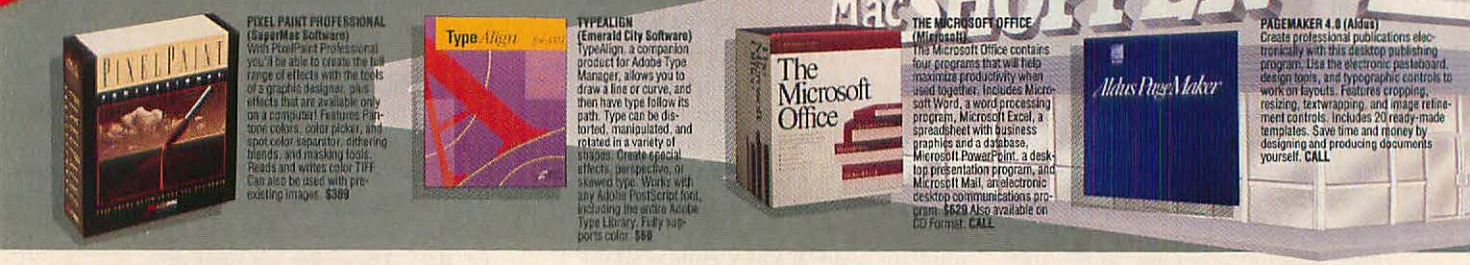
Each platform gives you additional options for viewing your data. After you've examined the initial results, you can use HyperCard-style buttons and dozens of pop-up and pull-down menus to see or hide as much or as little of the results as you like, change the way information is displayed, save interim results, or generate other analyses. JMP offers to perform only analyses that are appropriate for the levels of measurement of the variables involved.

JMP sports a handy journal feature where you can store interesting results—text and graphs—as you go along (see "Journal Window"). Once placed in a journal, the results can be saved in text-only or MacWrite format.

(continues)

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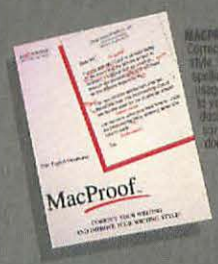
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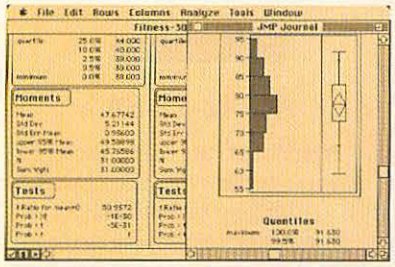
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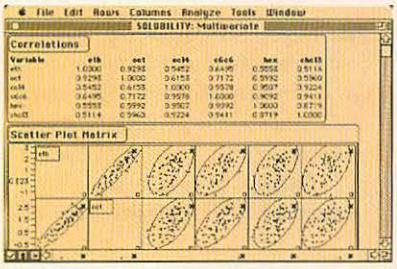
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Journal Window

The JMP Journal window on the right is extremely useful for storing results as your analyses progress.



Y's by Y's

In the Y's by Y's analysis, any point (or points) selected on one plot (indicated here by an *X*) is instantly displayed on all plots.

Data Handling

JMP excels at handling data transformations. You can sort, merge, and concatenate data tables, and you can select subsets of the current data table for further analysis. JMP's calculator makes it easy to create a new variable based on an existing one or based on a combination of several existing variables. Using a point-and-shoot technique, you can create complex expressions, formulas, and conditional statements to your heart's content.

The authors of JMP also recognize that not everything is data, so they've given you the option of treating some columns as weights, frequencies, or data labels. And like most good Mac programs, JMP doesn't expect you to enter all data by hand. Data can be read in as standard text files (in several formats), and there are provisions for importing data tables from SAS versions 5 and 6.

Problems

No product as complex as JMP is trouble-free in its first release. Running version 1.0's tutorial on a Mac Plus or an SE tends to cause System crashes, for example. To make JMP as bug-free as possible, the SAS Institute sent out a free patch disk to all registered owners, updating JMP to version 1.0.1 and correcting about two dozen problems.

However, JMP 1.0.1 still has a problem using 0 (zero) as a constant in the calculator. It typically appears as –0.□□□aE–21598 (or something equally interesting) both within the calculator and in resulting graphs. Putting zero in graphs also seems to cause occasional crashes. According to the SAS Institute, there's a problem with the way SANE works on the Macintosh Plus and SE. Hopefully, the company will find a workaround for the next release.

And then there are design issues. For instance, once you are in the calculator and begin to enter a formula to create a new column, there's no option to change your mind. You must enter some legal expression before JMP will let you close the calculator window. Similarly, there seems to be no way to stop an analysis in progress.

Finally, there's an issue that applies to all statistics programs: who is an appropriate user? Like many other statistical packages, JMP should carry this warning: "If you do not know the difference between nominal, ordinal, and interval measurement; what dependent and independent variables are; or what *significance level* means, do not buy this package. If you do not know how to design an experiment, conduct a proper survey, or construct a questionnaire, *please* do not buy this package." Generating analyses is easy; determining what the results mean and making sound decisions based on them is not. Although the manual demonstrates many analyses and suggests ways that the results can be interpreted, neither the manual nor the program is meant to train you to use statistics. To take advantage of JMP's capabilities, you need that knowledge coming in.

JMP Right In

Personally, I prefer the old-fashioned methods of statistical analysis; I want to control the output. If I just want a correlation matrix, I want to say so directly—without being forced to generate and display several intermediate analyses along the way. And, while spinnable 3-D displays with dozens of data points are pretty and impressive, attempting to interpret them (particularly on a diminutive Mac screen) is of only marginal interest to me.

JMP takes you halfway toward understanding your data. You select the variables and the analysis platform; JMP performs the appropriate analyses and displays the results. Then you do the interpretation. No matter how you roll it, the best any statistics package can do is keep you from going too far astray from your data. And JMP does an admirable job of that. But if you really don't know what you're doing, even JMP won't be able to help you.

—Steven Schwartz

See **Where to Buy** *or circle 738 on reader service card.*

Arcade-Style Strategy Game

PIPE DREAM

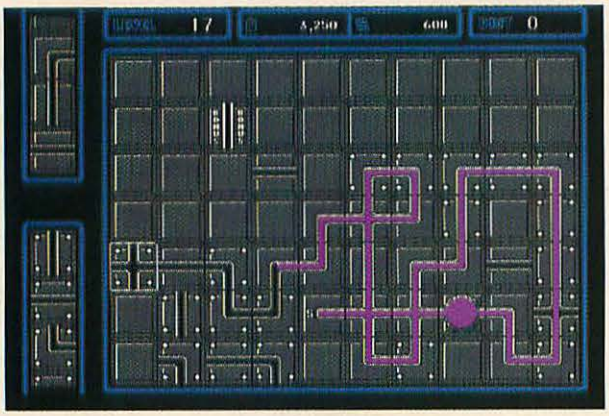
Pros: Many playing options for different skill levels; entertaining multi-player option; addictive. **Cons:** addictive; secret code must be entered before playing. **Company:** Lucasfilm (distributed by Electronic Arts). **Requires:** Mac Plus. **List price:** $39.95.

What should we expect when Lucasfilm, the company whose reputation was established with the *Star Wars* trilogy, releases an entertainment software package for the Macintosh? Epic intergalactic adventures? Heroes of mythic proportions? Dazzling visual effects? How about an arcade game based on plumbing?

Plumbing Wars

Pipe Dream is no *Star Wars,* but in its own way, it may be just as engaging. The plot is simple: You're a plumber in a race against time and *flooz,* a mysterious liquid that flows relentlessly from a starting point through the pipes you lay out on the playing grid. The more pipe you lay before the flooz catches up with you, the more points you earn. Pipes come down a dispenser in a variety of shapes, but you have no contol over the order in which you receive them—you must play them as they come. You can place pieces anywhere you like, though, whether or not they connect to any

(continues)



Double Dream
Pipe Dream's unique two-plumber option allows two players to work on structures cooperatively, competitively, or both ways.

other pieces. As your skill develops, you start playing pieces in patterns that anticipate connections several pieces in advance. If you incorrectly position a pipe, you can blast it away with another piece—if there's time.

The first few skill levels are relatively simple to master. You earn big points by building plumbing structures in which the flooz crosses its own path repeatedly. (Be forewarned: when it flows through a cross-shaped piece of pipe, flooz always flows in a straight line.) As your plumbing skills improve, you automatically advance to faster and more complex levels where you're given blockades, one-way pipes, reservoirs, ending pipes, and other variations to complicate things. The package claims there are 32 levels in all, but my research leads me to believe that the last few are reserved for Jedi masters.

The graphics are simple, with just a dash of color for Mac II owners. The digitized sound effects and music are on a par with other Macintosh arcade games and can be easily turned off when silence is appropriate. But special effects aren't the draw here—the game's the thing.

Return of the Pipe Fitters

Pipe Dream offers several variations on the basic play mode, including a Trainer mode that allows beginners to slow the action down and turn off the scoreboard; an Expert mode that provides quick-thinking players with two pipe dispensers; and a two-plumber mode.

The two-person game is a unique combination of competition and teamwork. Both players lay pipe—one with the mouse and one with the keyboard (see "Double Dream"). Players must cooperate to keep the pipework ahead of the flooz, while at the same time trying to outscore each other by laying more of their own pieces in the flooz path. A two-player game can be uneven and unpredictable when compared to solo play; the computer isn't quite as responsive when dealing with simultaneous commands, and you never know when your perfectly played piece is going to be replaced with your partner's. But if you don't take yourself or the competition too seriously, you're likely to laugh yourself silly trying to build flooz-proof structures with a friend.

The Flooz Strikes Back

Whether played alone or with another player, Pipe Dream has the same addictive quality as Tetris, that other popular battle against the forces of random geometry. Like gourmet potato chips, Pipe Dream constantly taunts you to indulge just one more time. Forget the time. Forget your responsibilities. Forget dinner. Forget sleep. Just one more game . . .

I can imagine Pipe Dream spreading like a virus, tying up Macintosh screens everywhere, further weakening our already shaky economy, were it not for the fact that you must enter a secret code from a cardboard code wheel each time you start the game up. There is one exception: no code is necessary to play the unequivocally inferior desk accessory version of the game that's included on the disk. This simple copy-protection scheme may be an inconvenience, but it may also save us from endless play.

—George Beekman

See **Where to Buy** *or circle 824 on reader service card.*

Data Acquisition

ACM2-12-8A

Pros: Includes two analog output lines besides digital I/O; also includes QuickLog Mac software.
Cons: Installation software can be frustrating; no high-speed A/D options.
Company: Strawberry Tree.
Requires: Mac II. **List price:** $1190.

WORKBENCHMAC 3.0

Pros: Flexible icon-based I/O programming system; interfaces to conventional programming languages; very easy for simple setups. **Cons:** Limited in scope compared with LabView.
Company: Strawberry Tree.
Requires: Mac SE. **List price:** $995.

Strawberry Tree (STI), an early supplier of analog interfaces for the Apple II, has developed a series of data-acquisition and controller boards for the Mac SE and II series, as well as exceptionally convenient interface driver software.

Friendly Acquisition

Every board manufacturer in the analog-to-digital conversion business is obliged to provide some form of driver software, which can range from a single-card HyperCard screen containing a handful of buttons to complete (and complex) programming languages. The centerpiece of STI's interface plan is the WorkBenchMac, an icon-based programming scheme that was clearly, to be charitable about it, "inspired" by LabView, the original icon-based data-acquisition language developed by National Instruments.

As is often the case, the test of a programming concept lies in the details of the implementation. Here STI has done a remarkable job. WorkBenchMac is the most straightforward and convenient program for data collection and manipulation yet developed. In the simplest WorkBenchMac interface, for example, you pull down the Analog/In icon from the icon well, located at the top of the screen, into the workspace, then pull down the Log icon (a picture of a floppy disk), and

(continues)

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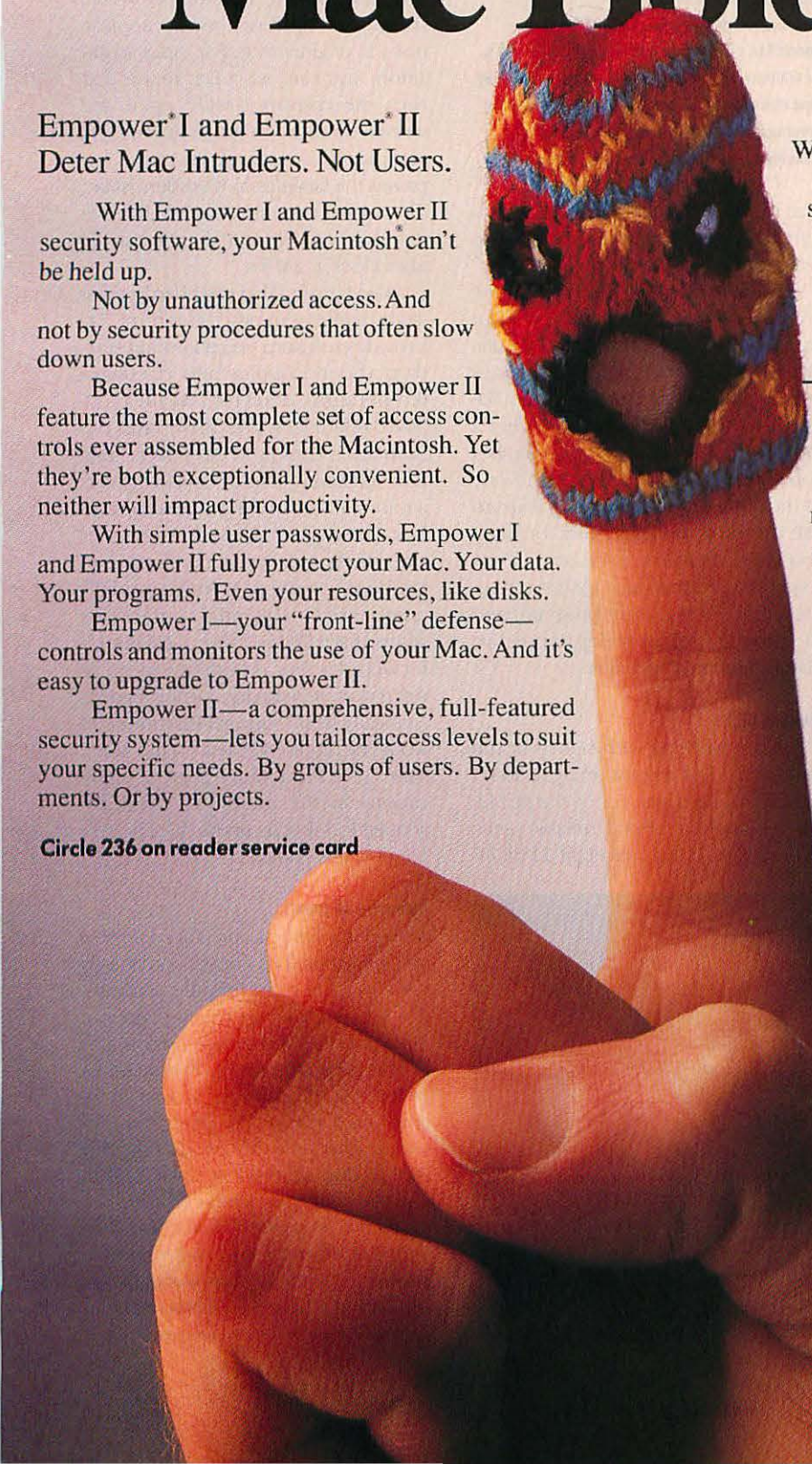
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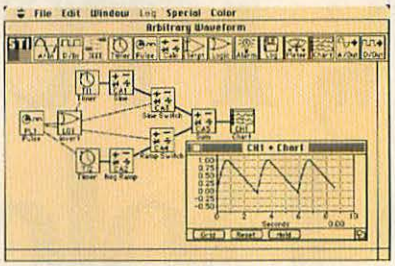
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connect the two with a pair of mouse clicks.

This procedure, which gives you a primitive but usable data-logging routine, is just the beginning. The other icons, notably Calc, let you perform a dazzling variety of data manipulations on single or multiple analog input signals (see "Making Connections"). Double-clicking on the Calc icon reveals a list of mathematical functions and combinations of functions—general polynomial, absolute value, minimum, maximum, integration, derivative, trigonometric, and logarithmic functions—and tables for assigning different variables for inputs to Calc. By assigning them as variables, you can mix analog-signal values with output from the Timer and Pulse icons or with externally supplied digital signals. In a few minutes, for example, you can string together a set of Calcs that behave as the functional equivalent of a low-speed lock-in amplifier. Furthermore, for those running low on imagination, STI has included dozens of possible icon setups, covering most common cases in data acquisition and analog-to-digital signal generation.

Many useful touches abound. The Alarm function can generate a spoken message from a timing signal or an event—the idea of an experiment shutting itself down at an appropriate end point and announcing "Your experiment is over" at short intervals has great appeal in some situations. A new icon in version 3.0, IEEE, allows you to program industry-standard IEEE-488 instruments and other devices. Interfaces linking WorkBenchMac routines to all common programming languages, including HyperTalk, are provided as well.



Making Connections

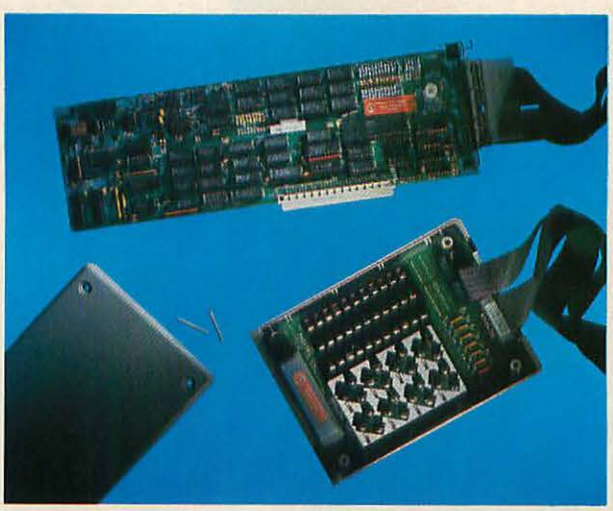
This diagram shows a fancy use of the WorkBenchMac's iconic programming capability—it's an arbitrary-waveform generator made possible by repeated use of the Calc icon. Simpler setups, for processing incoming analog data, can be constructed and tested on real data in minutes.

These capabilities, and a few more, are also present in LabView, but LabView's dedication to the formulation of virtual instruments sometimes gets in the way of simpler tasks. National Instruments' LabView offers a more complex software universe, but you will probably need to attend one of the company's seminars to learn to use the program effectively for high-end tasks. WorkBenchMac offers a way to get data into a Macintosh ten minutes after you load the program, and the program still provides impressive data-crunching capabilities.

Dancing Digits

If you are working with signals at the millivolt level or greater, and you aren't usually in a particular hurry, the ACM2-12-8A board is a refined, reliable piece of hardware. It features eight 12-bit input lines, eight digital I/O lines, and two 12-bit analog output lines; the catch is that the conversion speed is moderate for a board in this price range—in the manual Strawberry Tree's description of normal mode amounts to 300Hz. This is fast enough for chromatography and for most kinds of chemical and/or biochemical process control, but simply won't suffice for oscilloscope-like applications in engineering. For rapid acquisition, you can use a fast mode that runs the converter wide open and writes directly to RAM at 100,000 samples per second, but this bypasses the facilities of WorkBenchMac. The analog outputs offer 500,000 values per second, and the digital I/O lines clock at 2MHz.

Recognizing that the board's most likely market is in process control, STI provides software for calibrating standard thermocouples and resistance temperature detectors against onboard references. The board saves this calibration data in ROM. This calibration software is part of QuickLog Mac, a minimal version of the WorkBenchMac package; QuickLog Mac comes with the board. Actual connection to the board proceeds through a solidly engineered cable-and-contact-box setup that STI has been working on for decades. For megahertz speed or microvolt sensitivity, other boards (typically from National Instruments) would be required instead of the ACM2 series, but for a wide range of applications in the middle of the data-acquisition spectrum the ACM2s are a comfortable choice.



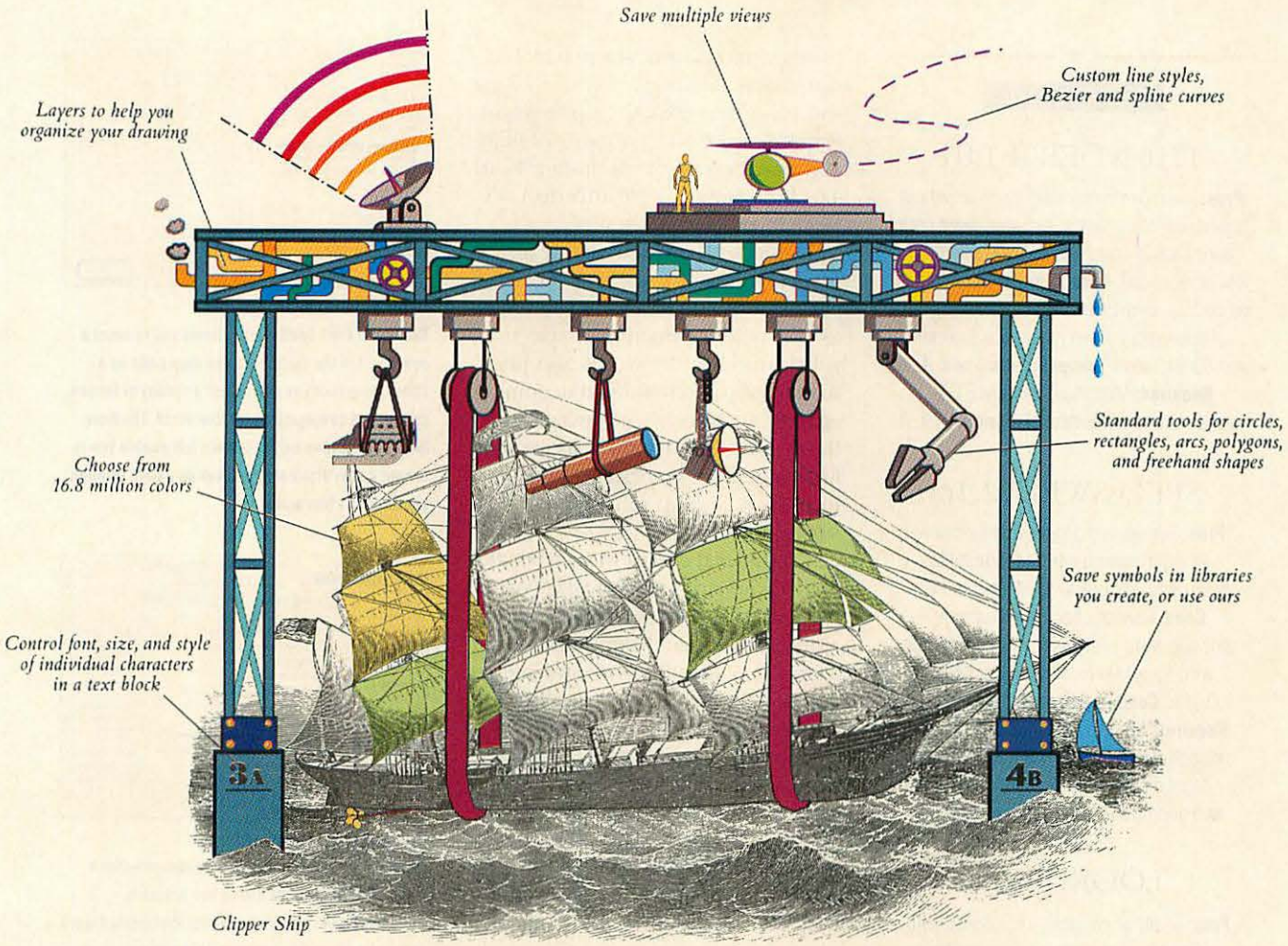
MARK JOHANN

The ACM2-12-8A from Strawberry Tree features eight 12-bit input lines, eight digital I/O lines, and two 12-bit analog output lines.

Summing All Inputs

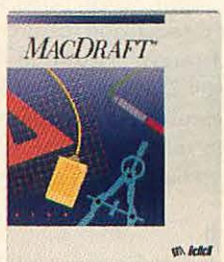
Strawberry Tree has produced a set of well-designed data-conversion boards with exceptionally friendly software. It's possible to start trying plain and fancy modes of data acquisition and output programming within minutes of loading the software, just from inspecting a few of the examples provided. This level of ease is not only rare in data-acquisition software, but usually connotes a severely limited system as well. WorkBenchMac is so simple it's fun, yet it provides enough power to generate complex data-manipulation schemes. **—Charles Seiter**

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Spelling Checkers

THUNDER II 1.01

Pros: Fast; can check spelling from within PageMaker documents; includes word count and reading-comprehension level; good documentation. **Cons:** Complex installation procedure; interface contains several layers of submenus; main dialog box is small and hard to read. **Company:** Electronic Arts. **Requires:** Mac Plus; System 6.0.2. Hard disk recommended. **List price:** $79.95.

SPELLSWELL 2.1c

Pros: Superb word-guessing function; straightforward interface; multiple options to customize spelling checking. **Cons:** Cannot check spelling from within a word processor; not compatible with PageMaker; slow under MultiFinder. **Company:** Working Software. **Requires:** Mac 512K. Hard disk recommended. **List price:** $74.95; medical and legal dictionaries $99.95; science and geographical dictionaries $59.95.

LOOKUP 2.0

Pros: Easily accessible DA; comes with two large dictionaries; easy to learn and install. **Cons:** Can only check single-word entries. **Company:** Working Software. **Requires:** Mac 512KE. Hard disk recommended. **List price:** $59.95.



Using software to correct scrambled apwllinf is a luxury compared with tracking down the corrections yourself. Yet the question remains, why spend money for an add-on program when the features are already incorporated in your word processor? The answer is speed and features.

Although Thunder II 1.01, Spellswell 2.1c, and Lookup 2.0 share some features, these updated spelling checkers differ in their user interface. And each has a different approach.

Thunder II

Formerly a desk accessory (DA), Thunder II is now a Control Panel device (cdev). No matter what program I opened, Thunder was accessible from the menu bar, thanks to its new compatibility modules developed by Electronic Arts. Thunder checks spelling and maintains graphics formatting in PageMaker 3.0 and a number of high-end word processors, including Word 4.0, WriteNow 2.0, WordPerfect 1.0, More II, and Acta Advantage.

Thunder II operates in one of two modes: interactive spelling checking, which alerts you to a variety of errors as you type; or document selection, which matches the words and punctuation of your completed document against Thunder's lookup table and flags each error. Thunder shows four lines of text, so you can see the word in context, and up to nine dictionary suggestions.

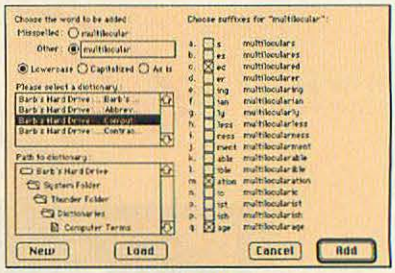
Thunder II comes with an 80,000-word dictionary, a smaller 50,000-word dictionary, and three subdictionaries, along with a stand-alone utility that allows you to edit, sort, and merge additional entries. You can also add shorthand notations to a glossary file, and Thunder II will automatically type out the full word from the shorthand version. Similarly, you can create a search-and-replace file to convert full words or numbers—an option that enables you to quickly remove bullets and diacritics from a Word file, for example, and convert them into type symbols and dingbats in PageMaker. I found this feature useful in preparing documents for typesetting.

Thunder II checked my document quickly, even with the maximum three dictionaries open. With large dictionaries loaded, the program uses approximately 225K of RAM. A word of warning: Thunder II clashed with my resident DAs and cdevs, especially screen savers, so I removed them from my system to prevent bombing. You can avoid this problem by prioritizing your INITS, cdevs, and DAs (for tips on how to do this, see "Getting Started with Troubleshooting" in the August 1989 issue).

In some ways Thunder II's many features seem unwieldy and confusing. For example, the compatibility modules can be only one folder deep in the System Folder. If the modules are buried too deep in your system folder, you can still paste corrections into your document—but you lose the formatting. Adding new words to your dictionary is also awkward. You are required to go through three different dialog boxes in the middle of a checking session.

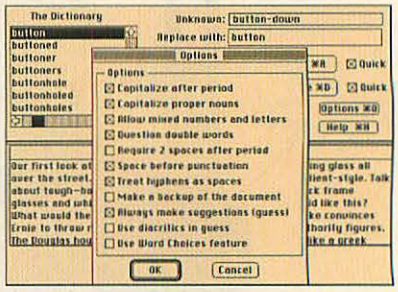
Lastly, Thunder II's preference-menu keyboard command, ⌘-hyphen, overrides PageMaker's discretionary hyphen command, a feature I need for flexibility in breaking lines of justified type. Still, these are petty annoyances compared to Thunder II's overall speed, immediate accessibility, and compatibility with PageMaker.

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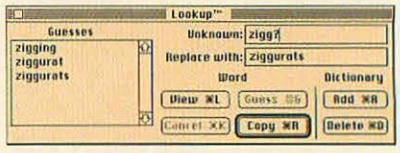
Enter Several Words at Once

Thunder II (like Spellswell) allows you to enter a new word in the dictionary and then calls up a submenu where you can select a variety of tenses, cases, and conjugations for that word. The New and Load buttons on the bottom left enable you to create a new dictionary and set up a path through the directory hierarchy.



Compound Those Words

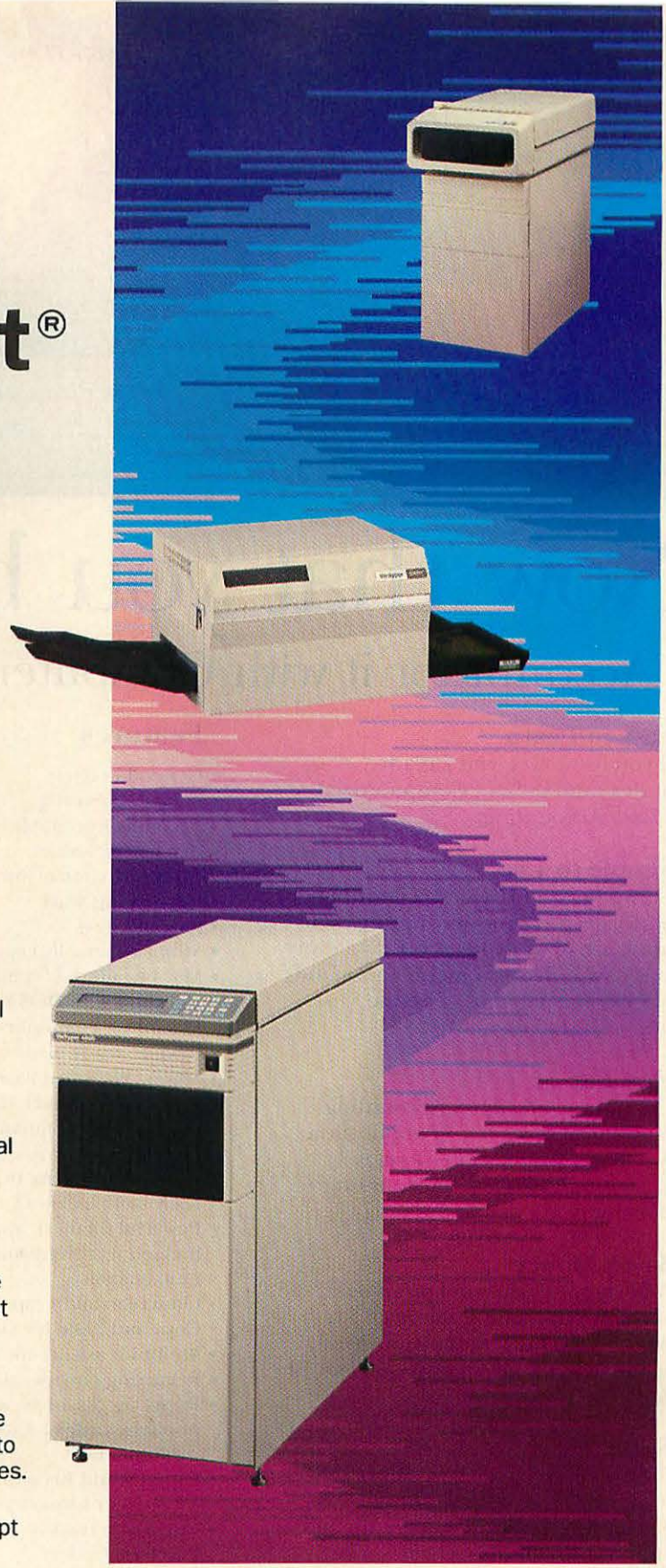
Clicking on the treat-hyphens-as-spaces check box under the Options dialog box prevents Spellswell from stopping at every hyphenated word (a feature shared by Lookup). This allows compulsive hyphenators to link up words to their heart's content without slowing down the program.



Streamlined Interface

In Lookup, you type the word you want to look up in the Unknown box. To guess at a word's spelling, use question marks or asterisks as wild cards.

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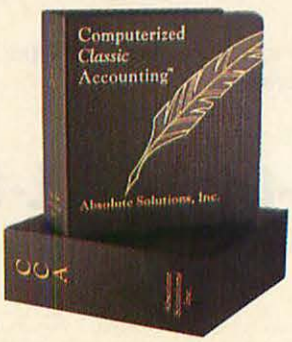
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Circle 203 on reader service card

Spellswell

Spellswell is a stand-alone application that you launch from the desktop. Spellswell's large main dialog box containing the commands and seven lines of text is intuitive and easy to read. Fortunately, there is only one level of submenus.

Spellswell does not work interactively as you type. It does, however, offer more suggestions than the other spelling checkers because the program first generates a phonetic suggestion and then consults its 120,000 word dictionary.

The Spellswell interface has been incorporated as an option in Microsoft Works 2.0, MacNet 1.5, and MindWrite. Currently, it is compatible with a host of word processors, including Microsoft Word 4.0, MacWrite II, WordPerfect, WriteNow, and Acta Advantage.

Additional specialized dictionaries, covering geography, science, law, and medicine are available. However, you can have only one dictionary open at a time. Spellswell does have a merge command that lets you combine dictionaries. If you combine dictionaries, the program can use as much as 800K, depending on the size of the added dictionary. Although Spellswell is slow running under MultiFinder, it fairly zips through your documents once it starts checking. Each time you open a new document, Spellswell reads the file, checks for duplicate words, and matches and sorts each word.

The vertical and horizontal scroll bars on the dictionary window are a nice feature. You can browse through the entire dictionary or locate the spelling of nonhighlighted words. Spellswell also has a usage checker, now called the Word Choice option in version 2.1, it checks to make sure you didn't mean I for eye, or between for among. This option slows the spell checking down to a snail's pace, however, and I appreciated being able to turn it off.

One slight drawback is that you have to exit an application and find Spellswell before correcting spelling and punctuation. You can, however, set up Spellswell to launch an application and return to Spellswell when checking is finished, bypassing the desktop completely.

Lookup

Lookup is a DA from Working Software, the makers of Spellswell. Accessed under the Apple menu, Lookup only checks your spelling interactively. You enter a single word in Lookup's dialog box, and the program scans its dictionary for the correct spelling. The wild-card option is Lookup's best feature. Mixing question marks with the letters of the word you want to find locates all possible permutations that contain the few letters you've typed.

My Selection

My ideal combination would have been to load Thunder II, for its compatibility with PageMaker, and add Lookup for quick dictionary browsing. Unfortunately, when I combined these programs my computer quickly bombed.

To check the spelling in completed documents, the best choice is either Spellswell or Thunder II. The three are close in price and performance, so the choice comes down to personal taste—spare and sturdy, or flashy with features. With either program, unscrambled spelling is just a mouse-click away.—**Barbara Tannenbaum**

See **Where to Buy** *or circle 848 (Thunder II), 844 (Spellswell), 741 (Lookup) on reader service card.*

Keyboard Shorthand Software

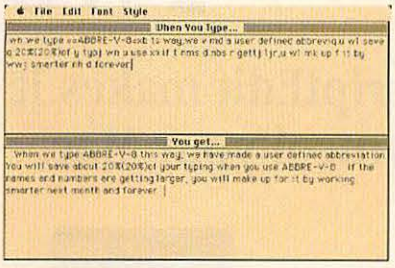
ABBRE-V-8 1.0

Pros: Inexpensive; saves keystrokes; has potential to help RSI sufferers.
Cons: Buggy and crashes often.
Company: Abbre-V-8. **Requires:** Mac 512KE. **List price:** $49.95.



People like me who suffer from carpal tunnel syndrome, tendinitis, or other repetitive strain injuries (RSIs) on the rise in the computer-using community are always looking out for products that can help ease the pain of typing.

Abbre-V-8 may be one of them. Abbre-V-8 is a shorthand program that abbreviates about 180 of the most common words, word parts, and word combinations, saving typists about 20 percent in keystrokes. Since how much RSI sufferers type is directly proportional to how much they hurt, this is a most welcome concept.



Demo Version

This special version of the software shows via split screen how Abbre-V-8's abbreviations turn into words without using any Shift-key or ⌘-key combinations.

Not Just Another Pretty Macro

Abbre-V-8 is not a macro program such as QuicKeys or Tempo. One of Abbre-V-8's strengths is that you don't need an extended keyboard or have to learn a raft of new ⌘- or Shift-key combinations. Abbre-V-8 lets you type as you usually do. You just have to learn how to type in Abbre-V-8's code, which is pretty easy, and mostly mnemonic once you get the hang of it.

If you were typing this paragraph, for example, you would be typing something very different from what you're reading. It would look like this:

If u wr typj ts paragraph, f example,u wd be typj qsqj very different m wt u're readj.it wd look lk ts:

No Control- or ⌘-key sequences were used. In fact, as you can see by comparing the full text to the abbreviated version, Abbre-V-8 can also recognize punctuation, so you don't have to type a space after a period or a comma. It automatically capitalizes the first letter in the next sentence, too. A demo version of the software makes it easy to see both how the abbreviations work and how many keystrokes are saved (see "Demo Version").

Abbre-V-8 seems to have taken into account most of the problems a touch-typist would encounter using abbreviation. For example, if you want to type a character combination that's sure to produce a word you don't want, you put a closing bracket (]) in front of it. The program toggles on and off at the keyboard, using a bizarre character combination that makes it virtually impossible to accidentally activate (or deactivate) the program. You can also install your own

(continues)

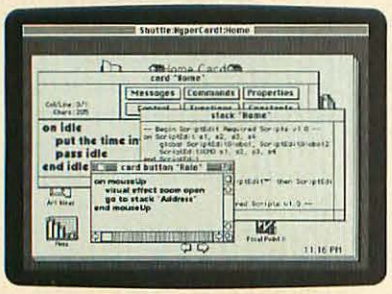
Two for the show.

ScriptEdit makes it easy to control your Mac.



Apple includes HyperCard inside the box with every Macintosh they sell. Why? Because HyperCard makes it easy for non-programmers to teach their Mac to perform simple, everyday tasks, and to work the way they do.

ScriptEdit makes HyperCard even easier by improving the way you write and edit HyperTalk ***scripts,*** the English-like commands and instructions that control your HyperCard projects. Even if you're a HyperCard beginner, you'll save time and effort with ScriptEdit!



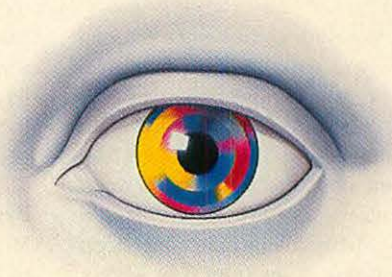
"ScriptEdit is one of the most well-designed and useful HyperCard add-ons we've seen yet, and we strongly recommend it..." — Dennis Klatzkin, *MacWeek* 12/89

"The amount of time you'll save should quickly justify the price." — Steven Schwartz, *MacWorld* 3/90

"This is an awesome program, dudes!"
— Scott Bieser, Newport Beach, CA

4 Mice *MacUser*, 2/90

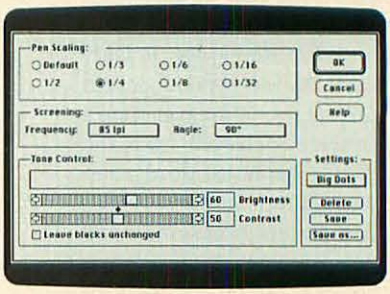
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Circle 249 on reader service card

abbreviations at the Control Panel or type in abbreviations on the fly.

Just a Few Problems

The program, however, has several limitations.

- Abbre-V-8 crashes on installation. It works fine when you reboot, but it crashed for me every time I installed it, and at random times as well. In addition, some of the automatic features, like spacing and capitalization, were capricious.
- Abbre-V-8 disrupted the operation of the shareware cdev SuperClock, and vice versa. I didn't test it exhaustively, but Abbre-V-8 seemed to interfere with operations in other applications too, even when it was toggled off. HyperCard, for example, hated it, and Microsoft Word 4.0's Change feature, under the Utilities menu, behaved very erratically.
- The documentation needs revision. Though refreshingly brief, it doesn't make a clear separation between the features and how it works versus learning how to type with it. In addition, the manual is downright opaque when it comes to describing the difference between using Abbre-V-8's Level 1 (for beginners) and Level 2, the more advanced mode of operation. I never did figure out how to use Level 2, even though that's the default setting for the Mac version.

Worth It? Probably

Abbre-V-8 is easy to install, use, and learn. The abbreviations are mostly obvious, and the documentation provides a chart for the ones that are more difficult to remember. Despite its annoying bugs, which I hope the author will fix pronto, I recommend this package to anyone with RSI who's trying to figure out how to keep a career.

Though by no means a cure, Abbre-V-8 is useful because it forces me to type more deliberately, to really think about what I'm doing with my hands, without forcing me to learn a whole new language of macros. It's clear a lot of thought went into the technology underlying Abbre-V-8, and aside from the above-mentioned erratica, it works fine. I just hope the upgrade ships with somebody who'll do my typing for me.—**Denise Caruso**

See **Where to Buy** *or circle 703 on reader service card.*

15-Inch and 19-Inch Color Monitors

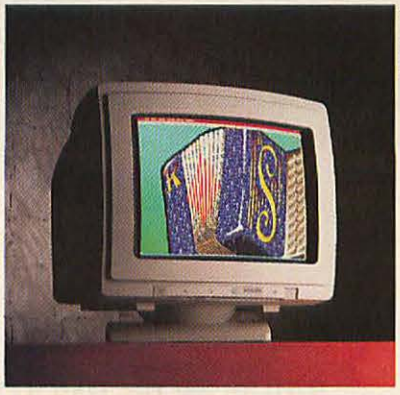
PHILIPS C1664N AND 2064ND

Pros: Low price, includes DB-9 to RGB cables; good range of grays. **Cons:** Poor whites; some distortion; tracking could be better; low vertical refresh rate.
Company: Pixelink Corporation.
Requires: Mac II. **List price:** C1664N $3595; 2064ND $3995; both include Miró video board.

Although a large-screen color monitor can be one of the most expensive Macintosh peripherals, Philips offers two inexpensive models, the 15-inch C1664N and the 19-inch 2064ND. Pixelink distributes the monitors in the United States and provides technical support. I tested these monitors with a Miró Datensystem 8-bit video board, which is included. Both monitors needed significant adjustments that required the removal of the exterior casings. A bright green cast showed across the smaller display—the result of an imbalance of the RGB electron guns. Because of poor documentation, I had to enlist the help of a Pixelink technician to adjust the guns. Even after adjusting the monitors to Philips's specs, both had a gray blue cast.

Color Quality

Neither screen displayed a bright 100 percent white; both appeared about 85 to 90 percent white. Around a brighter center the 15-inch monitor had a marked doughnut-shaped ring of gray. The top-left corner was darker still. With the screen set at 100% white I could see patches of pink, gray, and blue across the bottom-right corner.



MARK JOHANN

Philips C1664N color monitor

The 19-inch monitor displayed a much more even hue. Both monitors exhibited a decent range of grays but often appeared splotchy due to purity problems—particularly when I used a dithered blend from dark to light.

Problems with tracking and purity also affected color quality. Colors displayed on each monitor were muted and faded. Both monitors had accurate and attractive greens and blues; but warm colors like red and yellow were dull. Light tints appeared washed out. In part, the gray blue cast caused by the overcontribution of the blue and green guns is responsible for the quality of the cooler colors.

Although specifically designed for CAD/CAM applications, both monitors distort on-screen shapes. The 15-inch model showed vertical distortion, for example, squares were taller than they were wide by nearly 5 percent. Squares near the corners on the 19-inch monitor were taller than wide and bent at the edges. These are serious drawbacks for on-screen design work where you rely on the monitor for scale.

But Can I Read It?

I also checked text quality for word processing and CAD applications. Both monitors have a resolution of 1280 by 1024. The larger monitor displays the standard 72 dots per inch; the smaller has a dot density of 86 dpi. Higher resolution is useful for overviews of graphics or layouts, but it makes reading text difficult. The Miró board has a shareware utility that enlarges menu bar fonts, but it's still hard to work with the shrunken on-screen text.

Both monitors have a low, 60Hz vertical refresh rate. Some people can see flicker on monitors with refresh rates less than 72Hz. The medium-persistence phosphor did not cause significant ghosting, and there was little surge on either of the monitors.

Despite the low price of these monitors, I cannot recommend them. The dull colors, distortion, and the small or out-of-focus text fall short of the quality of other monitors on the market—**Tim Warner**

See **Where to Buy** *or circle 822 on reader service card.*

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Data-Mapping Software

MAPMAKER 4.0

Pros: Excellent documentation; generates maps in wide range of sizes; ability to interrupt redraw. **Cons:** No simple way to undo and reexecute some steps. **Company:** Strategic Mapping. **Requires:** Mac 512K. **List price:** $395.

MapMaker is a powerful tool for generating custom maps that graphically display data for a variety of applications, from business to education. Best of all, MapMaker's well-organized manual makes it easy to get started.

A tutorial guides you through the basic steps of creating a map using the accompanying boundary files, which contain screen coordinates for scaling a map. Maps can be any size, from a portion of a window up to a 10-by-10-page printout. The tutorial then shows you how to link data to the map and represent the data in different ways, such as using fill patterns to represent ranges of data or graduated circles to reflect the population of cities.

Now You're Cooking

To help you produce different types of maps, MapMaker comes with a Map Examples Cookbook. Each sample map takes advantage of such finishing touches as frames, drop shadows, and legend enhancements (see "Finished Map"). One example shows how to generate a state map, overlay it with a map of counties, display county population densities using random dots, and then erase the county lines to get a map showing state population distribution. The technique can easily be applied to any map for which the appropriate overlays and data exist.

MapMaker comes with a large collection of boundary files covering much of the world. Some files, generally for smaller areas, are stored in unprojected latitude-and-longitude format; other maps have been modified so that they don't look distorted when displayed on a flat screen or piece of paper. The program supports Albers equal-area conic projection, Millers cylindrical projection, and standard Mercator cylindrical projection.

The program also comes with a large assortment of data files. These contain demographic data that can be linked to specific boundary files. Additional boundary and data files can be obtained from a company called Strategic Locations Planning, but MapMaker lets you enter your own data, either manually, using the Data Values option, or with a tab-delimited file produced by a spreadsheet or text editor (see "Entering Data Manually").

Do-It-Yourself Maps

MapMaker not only lets you customize your presentation of the map, it lets you customize the map itself. Using the boundary file that contains coordinates for each of the 50 states, for instance, you can generate a map of a particular region of the United States. With the program's built-in drawing tools, you can add your own divisions and points. You can also convert a text file that contains the *x,y* coordinates or the latitude-and-longitude coordinates of polygons, points, and curves into a boundary file. I consulted my atlas to find the latitude-and-longitude of a dozen cities in Florida, typed them into a text file, and used the Convert Boundary Files option to create a boundary file that I could combine with the Florida state map.

An Auto-Trace tool lets you create an active map—one that can be linked to data—from a Paint or PICT image. You can then convert the map to a text file of screen coordinates and convert the text file to a boundary file. If you know the precise latitude and longitude of the extremities of your new map, you can establish a framework for the map. The framework enables you to superimpose a latitude-and-longitude grid on the map and to use the program's measuring tools to determine and label the distance between points.

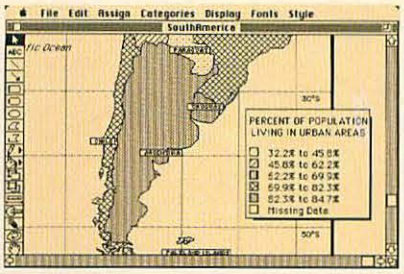
Stopping and Backtracking

One handy feature of MapMaker is that it doesn't make you wait as it redraws the map at each step. During redraw, if you click the mouse button, the watch cursor changes to a stop sign and then back to the standard arrow so you can get on to the next step.

In some cases, it can be cumbersome to erase changes you have made to a map. MapMaker has an Undo option in the Edit menu, but I was unable to activate it during my evaluation. You can hide a layer of information (the program is object-oriented), but if you want to eliminate that layer and redo it, you may have to delete each piece of information individually. The best strategy is to save a version of your map at each step so that you can just scrap an unsatisfactory map and go back to an earlier version.

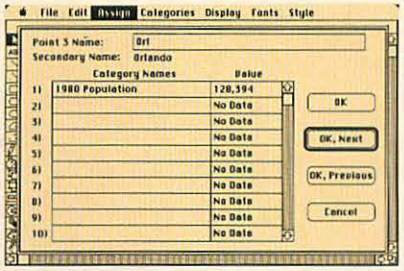
MapMaker makes it easy to manipulate maps and add information to them. Although it has the power and price tag of a business-productivity tool, MapMaker could also be put to excellent use in a wide range of classroom activities, from comparing research findings and illustrating reports to learning how to work with latitude and longitude coordinates.—**Gerry Lukos**

See **Where to Buy** *or circle 774 on reader service card.*



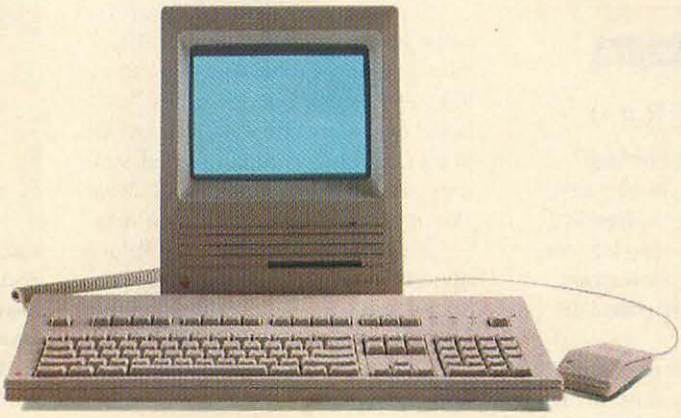
Finished Map

This map, created using a "recipe" from the Map Examples Cookbook, shows only some of the ways that MapMaker lets you embellish a map. You can move the legend and the country labels freely around the screen and change fonts and font sizes. Maps created with latitude-and-longitude files can be shown with a grid.



Entering Data Manually

For a simple map, you can enter data using this screen. Whether you enter data manually or by means of a tab-delimited text file, you can attach up to 30 categories of data to each point or area. Once a data file has been opened and linked to a map, you can switch categories using the Categories menu and thus easily make multiple variations of the same basic map.



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Paint-and-Draw Desk Accessory

DESKPAINT 2.01C & DESKDRAW 1.3

Pros: Compact, convenient, inexpensive, capable; compatible with word processors, page-layout programs, and HyperCard; edits scanned images; multiple Save formats. **Cons:** Some functions very slow. **Company:** Zedcor. **Requires:** Mac 512KE. **List price:** $129.95 (paint and draw modules not shipped separately).

The fact that DeskPaint and DeskDraw are bundled together as a desk accessory suggests two things: small size and a certain convenience. At only 51K for two modules, it occupies almost negligible space in your System Folder. As a DA, it is invoked from within other applications, a handy set of extra capabilities you can bring out to help you with whatever task you've got at hand—word processing, page layout, stack building, even data management. But because DAs are essentially utilitarian, you wouldn't ordinarily expect a program like this to be especially capable or fun. As it happens, this little paint-draw package is. And yet, because it's so accessible and so easy to learn, it gives even newcomers to the Mac the kind of immediate gratification of those first graphics programs produced for the personal computer.

In fact, DeskPaint looks a lot like MacPaint or one of the other bitmap programs from which it descends. It has two palettes—one for patterns and one for tools—both of which can be dismissed if you want to view the full window. The program offers five palettes' worth of editable fill patterns, and a sixth palette gives you 48 empty cells for creating your own. The Tools palette includes the usual choices for applying and removing pixels—pencil, paintbrush, air brush, geometric and free-form shapes, text tool, eraser, lasso, and so on. Using the Shift, ⌘, and Option keys when you select tools gives you an additional array of capabilities, such as transparent painting, or constraining vertical or horizontal mouse movement. Double-clicking lets you zoom in and out of your image or toggle FatBits. There's also a charcoal (whose adjustable softness and stroke width are nearly identical in operation to the air brush's flow rate and nozzle) and an interesting Auto Trace tool. Auto Trace traces bitmapped images, turning them into polygonal objects that you can then paste into DeskDraw.

Back to the Drawing Board

Once in DeskDraw, figures can be edited and manipulated as they are in other draw programs: skewed, distorted, and rotated on a user-definable pivot point. In addition, you can color a bitmapped image by exporting it from DeskPaint to DeskDraw as an outlined object and then filling it with one of QuickDraw's eight colors (red, green, blue, cyan, magenta, and yellow, plus black and white).

DeskPaint screens can be saved in any of four formats—MacPaint, PICT, TIFF, and TIFF compressed. Object-oriented graphics are saved in MacDraw, MacDraw II, SuperPaint, Canvas, or DeskDraw's own format.

Zedcor has topped off the package with excellent support in the form of a clearly written, well-illustrated manual and superb on-screen Help. One way to call up the on-screen Help is by selecting the Help tool from either the DeskPaint or DeskDraw Toolbox and clicking it on the tool or pattern for which you want information. Double-clicking on certain ones will also get you there. You remain in Help mode with the question mark as your cursor until you exit by clicking inside the main window, so you can explore the programs' capabilities on screen to your heart's delight.

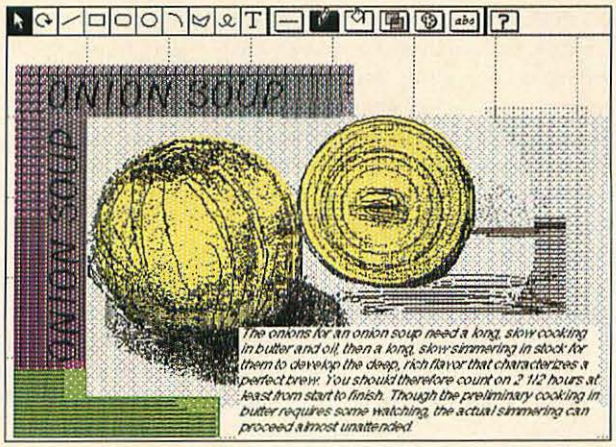
For the company to have packed all this expertise into a DA is a significant achievement, even if it does come at the cost of some speed; fill and redraw operations are particularly sluggish. You can, if you prefer, launch the DeskPaint or DeskDraw application and thus avail yourself of the maximum available RAM, but this negates the advantage of the DA and you're back to comparisons with standalones. Speed aside, both programs stand up very respectably to this kind of comparison, especially when you factor in the Help modules.

Who Needs It?

On first blush, this unassuming product wouldn't seem to offer much of interest to a computer graphics professional, and certainly Zedcor's little package poses no threat to Adobe Illustrator, say, or Aldus FreeHand. But the point of the DA is its accessibility from within other programs. DeskPaint and DeskDraw are compatible with word processors such as Microsoft Word, Microsoft Works, WriteNow, and WordPerfect; with more-advanced graphics programs like Illustrator and FreeHand; with HyperCard; and with PageMaker (where the DA's small size is sure to make a difference).

DeskPaint and DeskDraw constitute a real bargain for anyone in the market for a basic paint and draw package. Who knows? After you've used it to edit black-and-white clip art for pasting into an instructional HyperCard stack, or to spruce up your peace group's monthly newsletter, you just might be inspired to illustrate a favorite recipe or next year's Christmas letter (see "Onion Soup").—**Marjorie Baer**

See Where to Buy or circle 723 on reader service card.



Onion Soup
These onions were drawn on a Mac Plus using DeskPaint's bitmap module, then copied and pasted into DeskDraw as separate objects. Finally, color objects were laid in behind the bitmaps and text blocks, although the Plus's monochrome display made correct placement tricky.

Four Alternative Input Devices

THE CORDLESS MOUSE

Pros: Elegant alternative to regular corded mouse. **Cons:** Requires line-of-sight clear area between mouse and receiving unit. **Company:** Mobius Technologies and Practical Solutions. **Requires:** Mac 128K. **List price:** $149.

FELIX

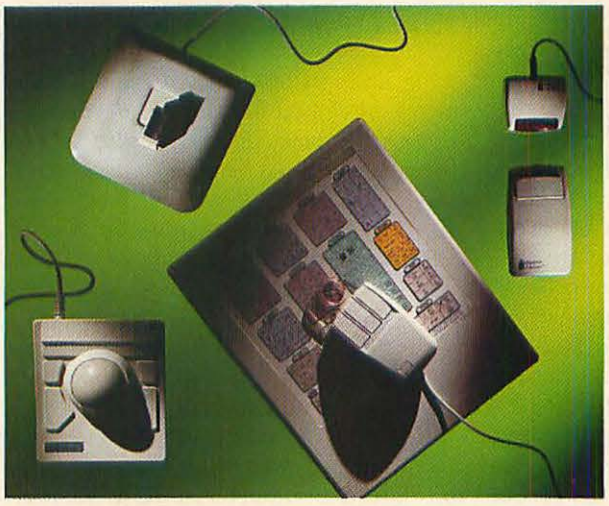
Pros: Precise pixel control. **Cons:** Tricky to learn. **Company:** Altra Corporation. **Requires:** Mac SE. **List price:** $169.

ROLLERMOUSE

Pros: Extra two buttons on unit. **Cons:** Large distance between roller ball and buttons. **Company:** CH Products. **Requires:** Mac SE. **List price:** $119.95.

WIZ

Pros: Access to menu commands via tablet template. **Cons:** Requires large desk area for tablet. **Company:** CalComp. **Requires:** Mac SE. **List price:** $249.



MARK JOHANN

Four alternative input devices, clockwise from upper left: Felix, The Cordless Mouse, the Wiz, and the RollerMouse.

If you're looking for an alternative to the standard Apple mouse, perhaps one of the four devices evaluated here will do the trick.

The Cordless Mouse

The elegant Cordless Mouse consists of two separate units. One looks like a mouse without a cord, while the second receives the infrared signal generated by the first unit and sends position information to the Macintosh. In the United States The Cordless Mouse is currently available from two companies, Mobius Technologies and Practical Solutions.

Installation is simple. Both an ADB adapter and a nine-pin cable are supplied with the receiving unit, making it easy to use with any Macintosh model. The receiving unit can pick up the signal from the mouse unit anywhere within 45 degrees either left or right, at a distance of up to 5 feet. Just be sure the view between the two units is unobstructed.

The Cordless Mouse works just like a standard mouse but has battery saving circuitry that shuts it off after a period of inactivity. Pushing the button on the left side of the mouse brings it back to life. The small red LED on the receiver lets you know whenever a signal is being received from the mouse unit.

I liked the feel of The Cordless Mouse but found that it was sometimes difficult to maintain a clear line of sight between the mouse and the receiver.

Felix

Felix is a mouse-trackball combination. It has a small handle with a button in the center that moves around within about a 1½-inch square. The handle is used to move the pointer around the screen, but the unit itself does not move. And a slight movement of the handle can move the cursor a long way.

Felix comes with an easy to use cdev program that allows you to customize its functions. You can, for instance, set Felix up so that with one movement of the handle you position the pointer to either the close box of the current window or to the Apple menu. Felix can also be customized to provide precise pixel control, which is helpful if you like to play arcade-type games or often use certain types of graphics applications.

Felix's one negative feature is that it takes a while to learn to use it effectively. Altra does, however, supply a helpful HyperCard stack that demonstrates the proper method of holding and moving the handle to help you learn how to use Felix.

RollerMouse

The RollerMouse is a trackball that stands out against a crowded field. RollerMouse has the same large ball with click and click-lock buttons found on almost every other trackball made for the Macintosh. The click and click-lock buttons can also be reversed for left-handed users. Two additional buttons can be customized to function as ⌘-key equivalents or frequently used menu items.

Another nice feature of the RollerMouse is that it provides a pass-through ADB connector, so using the RollerMouse won't tie up an ADB port exclusively. You can also program cursor speed.

My major quibble with the RollerMouse is that the distance between the ball and the click button is too large. I frequently had to stretch my thumb to reach the click button and so I found the device slightly uncomfortable to use.

You also can't remove the ball to clean the rollers. Although the fit between the case and the ball is snug, over time the inside of the unit collects dust.

These two small problems notwithstanding, the RollerMouse is an attractive alternative to the regular mouse, and its extra features place it among the more desirable trackballs available today.

(continues)

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PC MAGAZINE EDITORS' CHOICE
November 14, 1989
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Circle 104 on reader service card

Wiz

Of these four input devices, the Wiz deviates the most from the standard mouse. A combination mouse and intelligent tablet, its strengths are that it provides easy access to many menu commands in both application software and the Finder and that it can be customized through a combination of software and buttons located on the mouse unit.

Connecting the Wiz to your ADB-equipped Macintosh is simple. The mouse unit connects to the tablet, and the tablet connects to the ADB port. The Wiz file driver goes into your System Folder, and the Wiz-Mgr desk accessory is installed with Font/DA Mover.

The key to using Wiz's intelligent pad are its templates, color-coded plastic overlays and corresponding driver software that put menu commands, tool palettes, and ⌘-key equivalents directly on the pad. Wiz comes with a template for HyperCard, and templates are available (at additional cost) for most major business applications, including Excel 2.2, Word 4.0, and PageMaker 3.02.

To choose a template, you use the Wiz-Mgr desk accessory. Wiz asks you to open the software driver for that specific template and then to click the mouse button on the upper left and lower right of the template so that it has the reference points it needs to interpret your commands.

The mouse unit has three large buttons that rock back and forth. Two of them provide standard functions; the third can be programmed to perform two MacroMaker macros.

If that isn't enough, you can also program Wiz's mapping of the Macintosh screen so it functions inside a region of the window 1, 2, or 4 inches square; or you can make the position of the Wiz mouse on the tablet match the absolute position of the cursor on the screen. An optional pen will soon be available.

A full range of programmable options and additional templates, plus an impressive performance-to-price ratio, makes the Wiz a real winner in the race for alternatives to the standard mouse. I highly recommend the Wiz, provided you have a 9½-by-12-inch area open on your desk.

Which One's for Me?

If you want precise pixel control, consider Felix. If you like the standard mouse but want something a little different, take a look at the Cordless Mouse. However, if trackballs are your forte, RollerMouse is the obvious choice. And for those looking for a mouse-tablet with lots of features, Wiz is the winner. In any case, you're likely to be satisfied with the performance no matter which one you choose.

—Chris Ferino

See* Where to Buy *or circle 718 (Cordless Mouse), 727 (Felix), 837 (RollerMouse), 851 (Wiz) on reader service card.

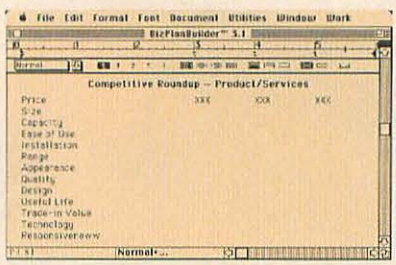
Business-Plan Template

BIZPLANBUILDER 3.1

Pros: Provides both format and comprehensive instructions for creating a business plan; includes a set of projections in SYLK format. **Cons:** Some sections of the plan are not fully explained. **Company:** Jian. **Requires:** Mac 512K; any word processor that reads MacWrite 4.5 or Word 3.01 files; any spreadsheet that reads SYLK files. **List price:** Version 4.0 $99.

If your business needs financing, and you need to show your financial backer a business plan first, BizPlanBuilder can help. It won't make the process of developing a business plan totally painless, nor will it relieve you of the need to consult experts, but it is a helpful guide.

BizPlanBuilder contains text templates for MacWrite 4.5 and Word 3.01 (or any word processor that can read those files), and a set of SYLK worksheet templates that can be read by most Mac spreadsheets.



Working with Tables in BizPlanBuilder
BizPlanBuilder's word processing template offers a number of tables like this one. The formatting, including tabs, makes entering data relatively easy.

BizPlanBuilder helps you to write a 70- to 90-page business plan by presenting you with a professionally formatted dummy document. You then edit the text in your word processor and substitute your figures for the dummy's in the spreadsheet files.

The text section contains headings, subheadings, and where appropriate, tabbed tables (see "Working with Tables in BizPlanBuilder"). The 11 main headings begin with Executive Summary; go on to Objectives, Marketing Strategy, and Financial Projections; and finally conclude with the Appendix.

Each section begins with pointers for editing the section. (These are set in italics, signifying instructional text that should be deleted before the plan is printed.) The pointers include a description of what should go into the section, hints on gathering the information you need, the suggested length of the section, and recommended readings.

Sometimes you must choose between words and phrases that are set off from each other by slashes, for example: "We have just started/completed the development/introductory phase. . . ." Other times you replace *Xs* with your own text. If the necessary replacement is brief, the template assists you with parenthetical hints, for example: "The ability to XXX *(what it can do)* with full capability on XXX *(list of applications, machinery, people)*." If you need to provide more extensive text, the template provides a set of suggestions.

The program offers eight financial projections in SYLK format, including 12-Month Budget, 5-Year Income Statement, Break-Even Analysis, and Use of Funding Proceeds. You can open these templates in a word processor and substitute your data for the sample data.

BizPlanBuilder is an excellent way to skip over the writing process and begin with editing, a less daunting experience; the only realistic alternative is to hire a business-plan writer. Even with BizPlanBuilder, however, you'll still have to round up a team of legal, financial, and marketing experts.

(continues)

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The ProModem 2400SE not only mounts inside your SE or SE/30 but it won't use up your only expansion slot. You will still be able to install an accelerator card or other add-on card if you like. The 2400SE takes only minutes to install with no modifications to your SE. Our unique Pass-Thru port connects other serial devices to your SE without the need for switch boxes or swapping cables. We even include an exclusive Status Lights DA that provides visual modem status just like an external modem.

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The template is self-explanatory, but to complete some sections, such as quantifying risk and documenting the results of focus groups, you will need professional advice.

While BizPlanBuilder makes a heroic effort to be useful for all types of businesses, retailers will have little use for many of the topics, such as Product/Service Description, Selling Tactics, and Manufacturing. Manufacturing companies will probably get the most out of BizPlanBuilder.

BizPlanBuilder fills your screen with the foundations of a plan and provides excellent suggestions on how to build upon it. The rest is up to you.—**Lawrence Stevens**

See **Where to Buy** *or circle 712 on reader service card.*

Programmable Telephone Switch Box

PHONE LINE MANAGER 103

Pros: Inexpensive way to make a single phone line do double or triple duty; programmable; handles most incoming calls automatically. **Cons:** Senses modem calls automatically only if a special code is added to the end of the dialing sequence (same for manual-dial faxes); must be connected to main phone line, rather than extensions. **Company:** La Cie. **Requires:** Mac 128K. **List price:** $199.95.

Although standard fax machines are still expensive ($700 or more), you may be contemplating a fax modem or fax board for the Macintosh instead. If you want to receive faxes as well as send them, but don't want to pay for a separate phone line, the typical solution is to tell fax senders to call ahead to prearrange the connection. La Cie offers a more practical answer. The Phone Line Manager allows you to connect up to three devices to a single telephone line—a phone, fax machine or fax modem, modem, telex, or answering machine—and flexibly switch between them on an automatic or manual basis.

Installation

The Phone Line Manager is an intelligent, programmable switch box that sits between the phone outlet and your phone devices. Separate RJ-11 jacks are provided for a telephone, a fax, modem, and one auxiliary device. Installation is as simple as plugging each device into the correct jack and plugging the Phone Line Manager into the wall jack. If you want to use an answering machine, you connect it normally; just plug the phone into the answering machine, and the answering machine into the Phone Line Manager's phone jack.

If there are multiple extensions in your home or office, however, things get a little trickier. For automatic operation, the Phone Line Manager must be the first device connected to the phone company's wiring block (where the phone line leads into the home or office). Depending on how your phone system is wired, it may be necessary to add an additional jack to split the main line in two. With a multiline PBX or KSU system, the last roll-over line must be reserved for the device.

How It Works

The Phone Line Manager listens to incoming calls and, if it detects that a CNG signal is present (sent by autodial fax machines and some fax modems), the switch box automatically routes the call to the fax. If it doesn't hear the signal, the Phone Line Manager listens for an additional tone—a touch-tone 3 or 4 —which allows it to direct manual-dial fax or modem calls to the correct device. If none of these conditions are met, the call is assumed to be a standard phone call. If you pick up the line before the device can handle the call, and it's not a voice call, you can press the 3 or 4 key on the phone to reroute the call. Outgoing calls are made as usual.

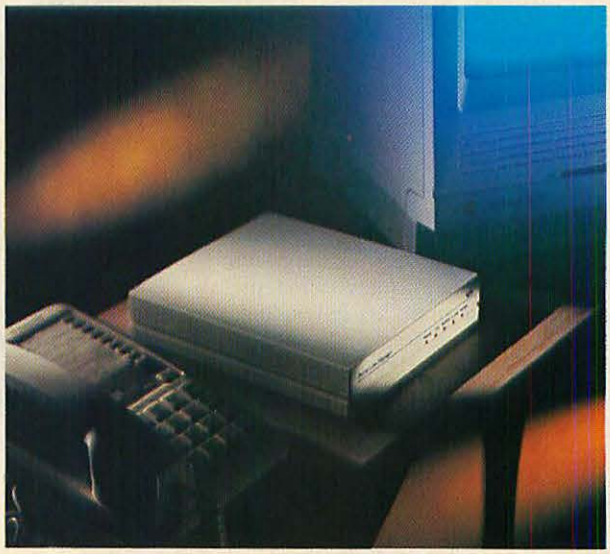
If the Phone Line Manager is already handling a call when the line is picked up, it sends a fast busy signal to the user's extension, or simply locks out the phone until the current call is finished.

By default the unit automatically routes calls to the fax after a specific number of rings. Unfortunately, non-fax calls also end up there. This option—like the touch-tone numbers for modem and manual fax calls—can be turned off or set to another value by programming the unit from your telephone handset. Since only manual fax calls will be lost if you turn automatic routing off, it may be preferable to do so. Autodial faxes will still be picked up and other incoming calls can be sent to an answering machine.

The Decision

The Phone Line Manager does have its limitations. Ideally, it would be able to distinguish all call types—voice, data, and fax—and simply route calls appropriately. But for its price, it does a good job. If you don't want to live with The Phone Line Manager's limitations or wiring requirements, you may decide that the simplest solution—to get another phone line—deserves equal consideration.—**Steven Schwartz**

See **Where to Buy** *or circle 823 on reader service card.*



MARK JOHANN

The Phone Line Manager sits between the Mac and the telephone, routing phone, fax, and modem calls.

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Circle 66 on reader service card

Workgroup Editing and Review Software

MARKUP 1.01

Pros: Allows multiple reviewers to comment on documents; good auditing features; complete set of editing tools.
Cons: Limited Undo feature; cannot edit in Fit in Window mode; can be less convenient than hard copy and a pencil.
Company: Mainstay. **Requires:** Mac Plus. **List price:** Version 1.02 single-user set $245; two-user set $495; five-user set $995.

MarkUp is a fascinating new product for group editing. It provides a mechanism for multiple reviewers to rewrite, annotate, highlight, strike through, correct, and approve documents created by most Macintosh applications. And because MarkUp uses its own print driver to print documents to disk, reviewers don't need to learn or even have a copy of the application in which the document was created. It's simple to learn and easy to use. Optimized for use with a network, MarkUp lets reviewers work on a document at any time. For those who don't have access to the network, documents can be exported in a special format called MiniMarkUp that creates a stand-alone application containing the document and a complete set of editing tools. Comments made in MiniMarkUp can later be merged with those of the reviewers on the network.

MarkUp works with most word processors, page-layout programs, and graphics programs. The version I tested wasn't compatible with QuarkXPress or HyperCard, but version 1.02, a free upgrade that should be available by the time you read this, is.

Getting Up and Running

Before a review can begin, the system administrator must use the MarkUp Administrator application to create one or more document centers (special folders that contain a list of reviewers and passwords).

Once the administrator has selected the document center and designated the authorized reviewers, the document is printed to disk and is ready to be reviewed. This procedure creates a MarkUp version of the document—the original version is not used, thus protecting its integrity.

A Typical Review

To review a document over the network, you must be able to access the document center from your Mac, be recognized as an authorized reviewer, and have a copy of MarkUp.

Performance over a network is surprisingly fast once a document is opened; Mainstay says the program is designed to keep the amount of data being sent over the network at any time to a minimum.

Once the document is opened, each reviewer makes comments on his or her own overlay. Reviewers can look at one another's overlays, unless they have been protected by their creator. A reviewer can only modify his or her own overlay.

When your overlay is finished, you terminate your review, freezing your comments. You have the option of approving the document at this time, signaling that you've signed off on it.

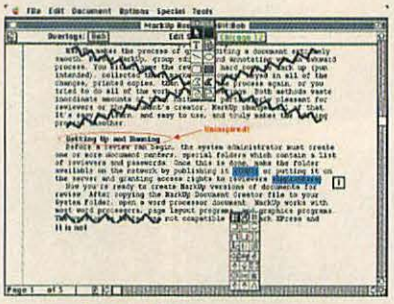
After all the reviewers are finished, their overlays can be merged and printed. Or, if you have enough RAM, you can use MultiFinder to view the merged overlays side by side with your original document.

MarkUp provides a wide array of tools for annotating overlays: boxes, circles, arrows, text, pop-up notes, and a complete set of proofreaders' marks (see "Plenty of Editing Tools"). If you've ever worked with a drawing or page-layout program, you'll be comfortable with MarkUp's tools almost immediately. Color is nicely supported on Macs with color capability.

In addition to facilitating group editing, MarkUp provides tools for tracking changes and documenting approvals, as well as a basic electronic-mail capability for document-center users. An editing journal that includes date, time, user name, and comments for each session is automatically created as reviewers work on their overlays (see "The Review Journal"). Journals can be exported or printed.

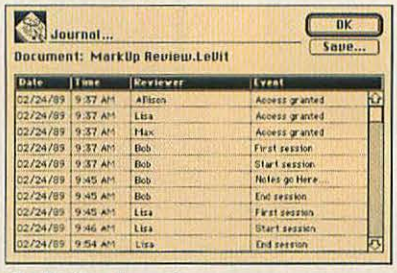
A simple mail system enables reviewers to send short notes to each other. If you have a message waiting, you are alerted when you log into the document center.

MarkUp includes a user's guide and a tutorial. The tutorial takes about an hour and contains everything you need to get started. The system administrator will have to spend some time with the user guide, but it is clear and concise. Technical support, though not toll free, is prompt and helpful.



Plenty of Editing Tools

MarkUp provides reviewers with a choice of tools including boxes, lines, proofreaders' marks, and pop-up notes.



The Review Journal

MarkUp automatically creates an editing journal that includes the date, time, reviewer's name, task, and comments.

High Marks

MarkUp does have its quirks. Its Undo feature works intermittently, and many actions cannot be undone. Another annoyance is that the Fit in Window mode doesn't allow editing—all you can do is look at the document and the overlays. There is no confirmation procedure when creating passwords, so you have to type them carefully. Finally, although MarkUp is relatively easy to learn, it sometimes feels awkward to use tools and palettes to edit copy. But hard copy and a pencil just don't cut it for group editing. Even with its rough edges, if you need to have your documents reviewed by a group of people, you'll like MarkUp.

—Bob LeVitus

See Where to Buy or circle 775 on reader service card.

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- ☐ **PostScript Fonts (3 disks) (5701)**—Many different downloadable laser fonts.

EDUCATION

- ☐ **Natalia's Dots/Word Match (6020)**—Programs to entertain and educate the young child.
- ☐ **Typing Teacher/Spelling Tutor (6015)**—Improve your typing skills and learn to spell (digitized sound!) with these two fine programs.

GAMES

- ☐ **Arcade Games 1 (6501)**—Three addictive games! Space Station Pheta, Adventures of Snake, and Gunshy 1.1.
- ☐ **Arcade Games 2 (6502)**—Two Centipede games, Tron-Cycles, and more.
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- ☐ **On Call (6750)**—Be the doctor "on call" in the hospital emergency ward.
- ☐ **Radical Castle (6760)**—An adventure game with digitized sounds and graphics.

UTILITIES

- ☐ **Custom Utilities (7525)**—Customize your Mac with Startup inits, wraparound pointer, password protection and more!
- ☐ **Font Utilities (7515)**—Font tester, font finder, sorters, and many more.
- ☐ **Hard Disk Utilities (7500)**—Everything needed to maintain and improve your hard disk!
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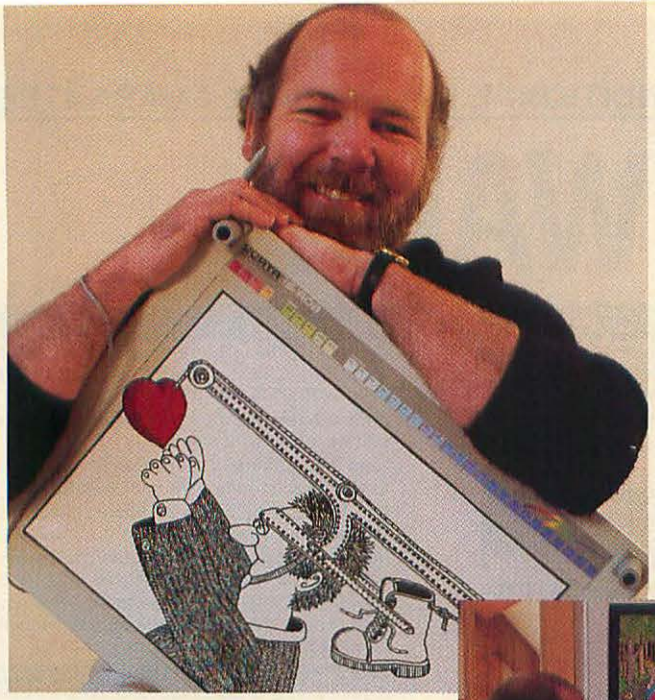
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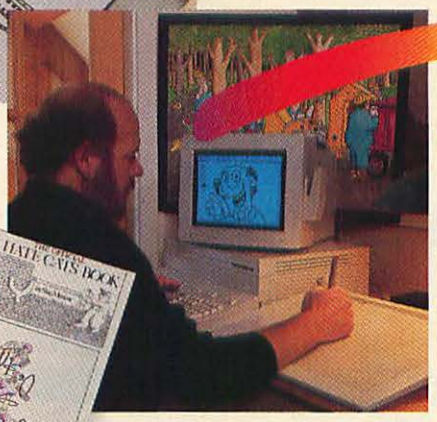


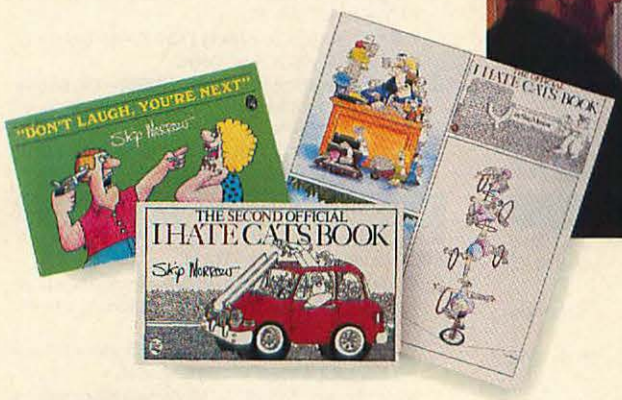
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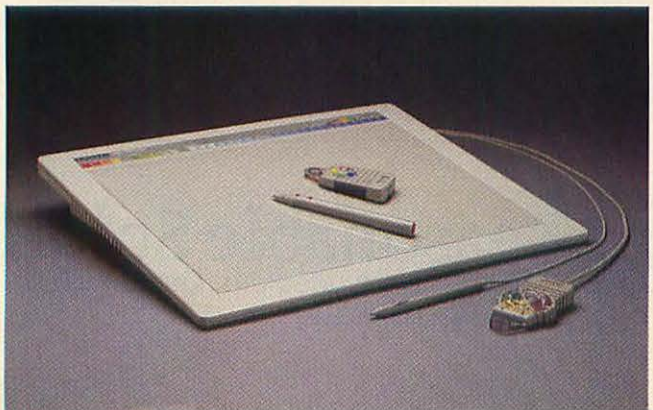
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Plotting and Analysis Program

IGOR 1.1

Pros: Fast plotting; options provide full control of plot symbols, sizes, and fonts; page view allows precise placement of plots, tables, and PICT files; can write macros and procedures for automated analysis. **Cons:** Limited text-data import facilities. **Company:** WaveMetrics. **Requires:** Mac Plus. **List price:** $195.

If you are looking for a plotting package, you have a number of choices including the new version of KaleidaGraph (see *Reviews,* April 1990) as well as the release of Passage II. There's also a powerful newcomer, named after Dr. Frankenstein's famous lab assistant, Igor.

The First Wave

Igor has a slightly different way of accepting data for plotting and analysis. It defines a *wave,* which is simply a sequence of numbers. Igor treats all data as sequential, therefore you do not have to provide x values for a series of y values in order to create a plot. The y values alone are sufficient to create a plot. If you have a string of data, say daily stock prices, Igor can plot it without knowing the dates that correspond to the prices; a nice feature for a quick look-see at your data.

Having It All

There are a few plotting and analytical options missing from Igor. It can handle standard trigonometric, logarithmic, and Fourier transformations; can integrate and differentiate; and can use any order polynomial for least-squares fitting of data. Plot types include: scatter, line, line to zero, histogram, and cityscape (a modified type of histogram plot).

Igor also supports powerful nonlinear least-squares fitting. You can use the predefined functions, such as Gaussian, Lorentz function, sine, exponential, and double exponential, or you can define your own using just about any mathematical function known.

I particularly like the Show Info command; you select two special cursors to define a specific range, or subset, of the plotted data to be used for analysis.

Although it's not a big thing, I wish that Igor's zooming of plots were a bit more interactive. To rescale a plot, you must make a menu selection and type in the new values for the scales of the x and y axes. I'd much rather see a tool that lets you select a part of the graph that you want to zoom, as KaleidaGraph does.

Setting It to Auto-Pilot

In addition to the standard plot windows and data-table windows, Igor also displays a command window at the bottom of the screen. This window has a line for typing in English-like commands to select fonts, plot styles, label axes, and so on. Each command that you type and execute is stored in a log called History, which you can save as a file for documentation or for later use.

If you use the History to develop a particular analysis that you plan to use again, you can edit the file in Igor or any text editor and perform exactly the same analysis on other data. Igor even includes ways of specifying file names, so you can write an analytical procedure that can be used over and over again—all you need is the file name of the new data file.

To simplify the creation of an analytical procedure, Igor concurrently displays the resulting command for every action that you make in Igor. For example, when you select a symbol and color for plotting data, the window containing those options also displays the resulting command, which you can execute immediately, or paste into Igor's command window.

Igor's macro language includes several control structures—for example, if, else, endif, loop, do, while, break—to form a powerful language for automating analyses.

Igor also has a provision for External Operations, or XOPs, that resemble HyperCard's external commands (XCMDs). You can use either MPW or LightspeedC to create XOPs to add features not currently found in Igor.

Getting It Out

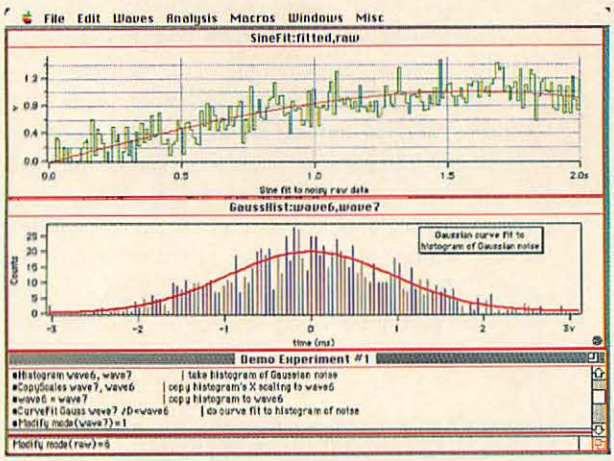
Igor includes a fairly powerful page-layout feature for creating hard copy. You can take any plot that you've created and place it anywhere on the page, at any size. In addition, you can create new tables of calculated parameters (from a fitted function, for example), or select part of your data to become a table on the page. PICT files can also be pasted (via the Clipboard) onto the page. Once you have the page laid out, you can save the layout as stationary to be used for future plots; you can even include named layouts in macros.

I'd recommend Igor to anyone who has to perform highly sophisticated analysis of data. Plotting data and calculating transformations and analytical functions are fast, and the program's tools are easy to learn.

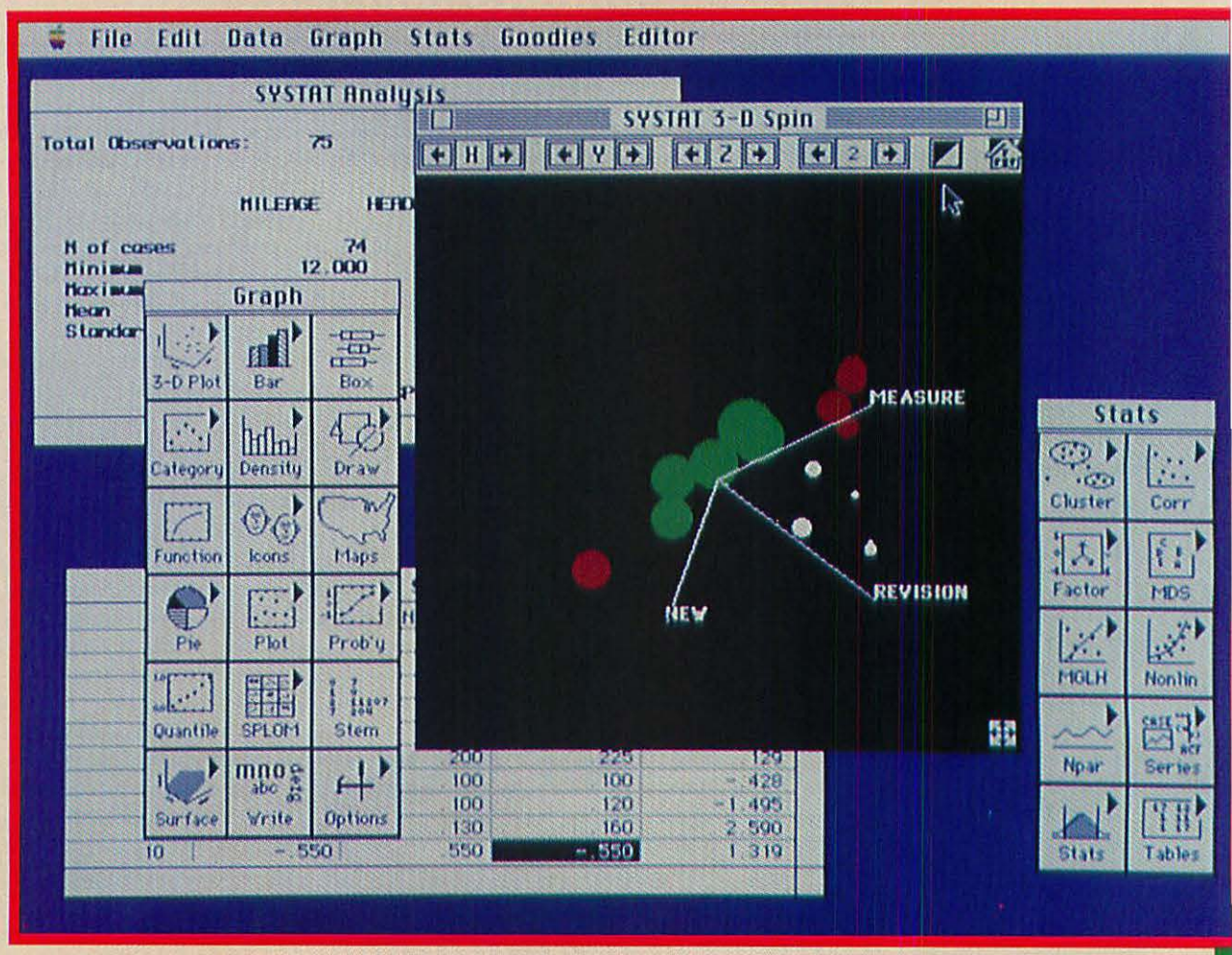
Igor's macro language is especially strong and provides automated analytical capabilities not found in similar programs. If you have a large number of data sets that have to be analyzed repetitively, then Igor's for you.

—Dave Kosiur

See **Where to Buy** *or circle 735 on reader service card.*



Plot Types
The uppermost window is called the cityscape, while the middle window includes the line-to-point style and a standard line style. The bottom window is Igor's command window, showing part of a macro that was used to produce the middle plot.



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WINDOW SHOPPING

by Lawrence Stevens

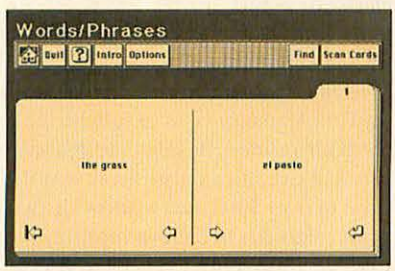
This month I review a foreign-language flash-card stack, two programs that help you write letters, and a time organizer.

VocabuLearn/CE

VocabuLearn/CE ($49.95, including HyperCard, from Penton Overseas) is a HyperCard stack for building foreign-language vocabulary. It comes in five editions: Spanish, French, Italian, German, and Japanese (which goes for $59.95). The package includes a 36-page vocabulary list, two 90-minute audio cassettes, and a HyperCard flash-card stack. The book, stack, and cassettes list the words in the same order so they can be used together.

VocabuLearn/CE is strictly a vocabulary builder, not a language-learning program or phrase book for tourists. While the program includes short expressions, such as "good night" and "not so fast," it omits longer phrases such as "Where can I find a room with a bath?" So while it provides practice with words, you'll have to learn sentence construction elsewhere.

The cards are designed to resemble flash cards divided into two sections (see "Language Flash Cards"). The word, foreign or English, is displayed on the left side; you try to remember the equivalent and then click



Language Flash Cards

When this card is first displayed, only the words on the left side of the card are visible. You try to remember the Spanish word for *grass*. The correct answer, *el pasto*, appears when you click on the right side of the card.



the mouse button to have the correct answer displayed on the right side.

The Options card lets you determine which parts of speech you want included in your practice session, the speed at which the cards change after the correct answer is revealed, and the order—in sequence, random, or reversed—the cards are displayed in.

When I was in school, I used to love flash cards. I could study them in the cafeteria, while I waited for a bus, and before the teacher handed out the test. Computer flash cards should offer some features that paper flash cards don't have, to make up for the lack of portability. VocabuLearn adds nothing and actually lacks one important feature: the ability to remove the cards you know (anyone who has used flash cards remembers how good it felt to see the stack get smaller).

On the positive side, VocabuLearn's word list is extensive, the voice is clear and pleasant, and the HyperCard interface is attractive and easy to understand—but I still prefer cardboard flash cards.

ClickWriter

ClickWriter is a set of HyperCard stacks that enable you to draft letters by selecting phrases and paragraphs with mouse clicks. ClickWriter comprises five editions: Children's Letters, Complaint Letters, Teacher's Letters, Secretary's Letters, and Recommendation Letters (each sold separately for $24.95 from StackWorks).

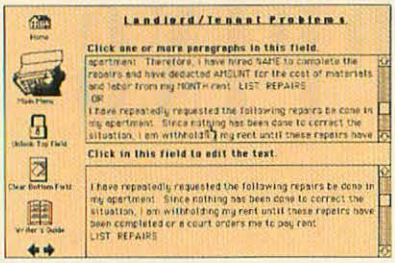
The stacks include between five and eight letters each. For example, the Teacher's stack has five letters, including Homework, Field Trip, and Special Events.

To construct a letter using ClickWriter, you go through a series of cards that each contain a section of a letter, such as the address, salutation, body, and complimentary close. These cards all have two scrollable fields (see "No Typing Necessary"). The top field contains a selection of phrases and paragraphs that can be copied, pasted, and edited in the bottom field. You can also add your own boilerplate phrases and paragraphs to the top field.

After you have worked your way through all the cards, the completed letter, made up of your selections, is displayed and can be edited and printed in HyperCard or exported to a word processor.

Many of the cards in ClickWriter only save you a few seconds of typing. For example, the selections in the salutations card include "Dear PERSON'S FIRST NAME:," "Gentlemen:," and "To whom it may concern:." However, the card that contains the body of the letter is abundant with paragraphs with which to build your letter. For example, the Appointments Cancellations letter in the Secretary's stack has paragraphs to cancel appointments, to confirm appointments, and to set up an appointment.

(continues)



No Typing Necessary

You find the paragraph you want by scrolling through the upper field. After clicking with the hand tool on the paragraph, the paragraph you choose is pasted into the bottom field, which becomes your letter. The padlock button unlocks the upper field, allowing you to add new boilerplate paragraphs.

The text in ClickWriter is concise, polite, and clear. My only complaint is that there is no way, other than HyperCard's Find function, to locate the paragraph you want. An index or a sort function would be a great asset. Aside from this, ClickWriter provides the easiest way I've seen for creating formula letters.

ResumExpert Cover Letters

Last October I reviewed a set of Microsoft Word (3.0 and later versions) and Microsoft Works 2.0 résumé templates called ResumExpert from A Lasting Impression. Since then, the company has released ResumExpert for Sales & Marketing Pros, ResumExpert for Managers, and ResumExpert Cover Letters. The company promises to release six more modules shortly: Computer Science & Engineering, Finance and Banking, Students,Healthcare Professionals, Educators, and Glamour Professionals.

ResumExpert Cover Letters ($75) complements the résumé templates. Because you will probably write more cover letters than résumés, you'll likely make better use of this module than the others. The 48-letter set has 6 letters for making a career change, 3 for securing an entry-level position, and 3 explaining why you were laid off. There are also 3 letters to professional recruitment agencies, 2 thank-you letters for an informational interview, and 2 letters introducing yourself through a mutual contact.

Most people have résumés ready to mail out but delay because they don't have time to compose a cover letter. Now they will have no excuse.

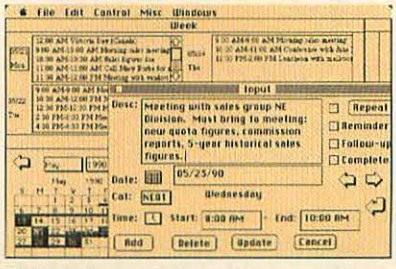
MyTimeManager 2.0

MyTimeManager ($79.95 from MacShack Enterprises) is a time organizer that includes weekly and monthly calendars and an alarm to warn you of upcoming appointments.

The Week screens, which contain seven scrollable fields (one for each day of the week), display each event's description truncated to about 21 characters, along with the event's beginning and end times (see "MyTimeManager's Screen"). Clicking on any event description in the Week screen brings you to the Input window for that event.

The scrollable Input window, where you change, add, or delete events, displays the complete (up to 256 characters) description of the event, the event category, and check boxes to indicate whether an event needs follow-up or not. Unfortunately, the Follow-up and Complete check boxes are not connected to other features of the program. For example, you can't generate a list of events requiring follow-up.

The Input window has a number of ingenious features to make creation of new events easy. Instead of typing the date, you can use a pop-up menu that includes Today, Tomorrow, Yesterday, and This, Last, Next, and Every, along with a submenu of days of the week. For example, if you make a luncheon date for the following Friday, you can select Next and Friday and the program automatically enters the correct date. You can also use a pop-up menu to select the start time



MyTimeManager's Screen

All appointment information is entered in the Input window. The date, category, and time buttons contain pop-up menus. The left and right arrows allow you to flip forward and back through your appointments. The left-hook arrow is used to display the next appointment. A portion of the Month window appears at bottom left. The day boxes are highlighted in proportion to the amount of the day that is taken up with events.

of an event that falls between 8 a.m. and 5 p.m. (other times must be input). Finally, another pop-up menu allows you to create ten categories that events relate to.

The program's Repeat feature lets you enter events that reoccur regularly. You can have events listed in the calendar every first, second, third, fourth, or fifth minute, hour, day, week, or month for up to ten repetitions.

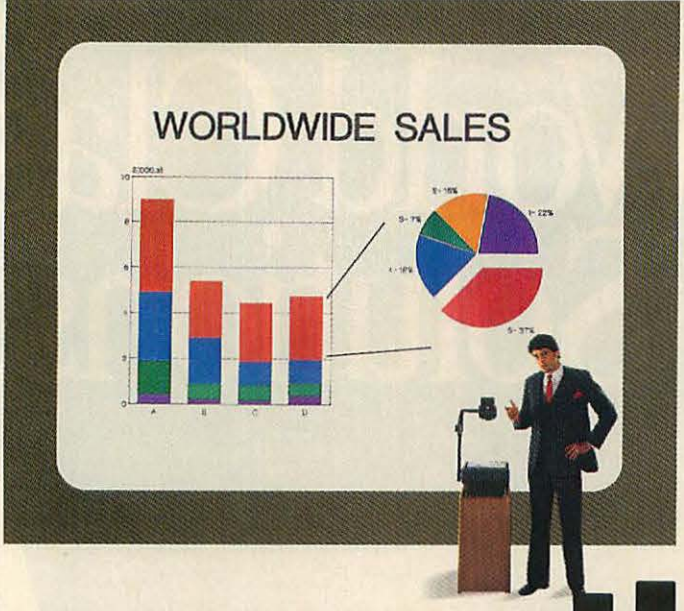
The Input window also gives you the option of entering the end time of any event, which protects you from scheduling conflicting appointments.

The program provides good integration between its three screens. The Month screen, which displays three small month calendars, has day boxes highlighted to indicate that portions of the day are scheduled. By holding down certain keys while clicking on a day box in the Month screen, you can either move directly to a blank Input screen for that day, go to the Input screen of the first scheduled event of that day, or go to the Week screen that contains that day.

The alarm feature, which lets you know with a dialog box and a beep when it's time for an appointment, is not as good as the alarm features in other programs such as Rendezvous and Focal Point II. The biggest problem of MyTimeManager's alarm is that it works only if the program is open or if the program is in the background under MultiFinder. The alarm also has a number of annoying quirks. The only way to stop the alarm from resignaling every few minutes is by unchecking the Reminder check box in the Input window of the event the alarm is warning you about. You also cannot set the alarm to signal you at the exact appointment time, only 5, 15, or 30 minutes ahead of time.

Despite these few problems, MyTimeManager is an excellent value for your money. Besides the features listed above, it can also show you the time in over 100 cities worldwide, will print calendars in daily or monthly format, and has a Find function. It is an extremely comprehensive program that has the potential of becoming one of your most-used applications. M

See **Where to Buy** *or circle 849 (VocabuLearn/CE), 714 (ClickWriter), 835 (ResumExpert Cover Letters), 817 (MyTimeManager) on reader service card.*



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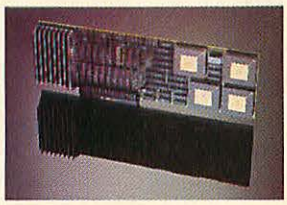
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NEW PRODUCTS

Edited by Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE



21 MIPS RISC Coprocessor

21 MIPS RISC Coprocessor (RP88B25)

25MHz coprocessor for the Mac II with built-in floating-point processor. Provides up to 9 million floating-point operations per second and 21 MIPS. $10,995. Tektronix, 503/627-7343.

7212 VMEbus Board

7212 VMEbus board that allows a Mac II to control multitasking, multiprocessing VMEbus systems located up to 100 meters away. Plugs into a Mac II slot. Provides 32-bit, 4MB-per-second link to the VMEbus. $4950. Beedie & Atack Partners, Avalon House, Cranston Rd., East Grinstead, West Sussex, England, RH19 3HG.

ATS Convertible Kit

Kit designed to convert the



ATS Convertible Kit

Mac 128K or 512KE main logic board into the functional equivalent of a Macintosh Plus or SE. $375. Atlanta Technical Specialists, 404/292-6655.



CD ROM Desktop Drive

CD ROM Desktop Drive

Half-height CD ROM drive with embedded SCSI interface. Has 64K buffer and average access time of 400 milliseconds. Stereo audio-output capability allows headphone connection in the front of the unit or a line out to an external stereo amplifier from the rear. $1130. Laser Magnetic Storage International, 719/593-7900.

ClearScan Color

Hand-held color scanner for use with desktop publishing systems. Has a 2½-inch scanning window and provides three brightness lev-



ClearScan 8-bit Color Output

els; inputs up to 256 different shades of color. $495. NCL America, 408/734-1006.



Graflex

Graflex

Printer interface that emulates the Apple ImageWriter II. Compatible with all Mac models and all dot matrix printers that support graphics and use the standard parallel interface. $119.95. ICD, 815/968-2228.



JetWriter

JetWriter

Device-management system that includes software and hardware components to provide a seamless, transparent connection between a Mac and an HP LaserJet. User selects JetWriter from the Chooser. $345. Insight Development Corporation, 415/652-4115.

La Monz Color System

Color system that includes a 19-inch Sony Trinitron Color Monitor and La Cie's 8-bit or 32-bit video board. 8-bit $3999; 32-bit $5999. La Cie, 800/999-0143.



MacMainFrame Coax Gateway

MacMainFrame Coax Gateway

Hardware and software product that provides access to up to five IBM host sessions for any client Macintosh connected to a Mac server via Appletalk. Supports cut, copy, and paste functions; keyboard remapping; pull-down and tear-off menus; and MultiFinder. $2495. Avatar, 508/435-3000.

(continues)

Mactivator

Programmable software-security device that plugs into the Macintosh's SCSI port. $48.50. Software Security, 203/329-8870, 800/333-0407.



On-Command

On-Command

Hand-held remote device that replaces Mac keyboard and mouse for desktop presentations, product demonstrations, and training sessions. Allows presenter to control computer from up to 40 feet away. Consists of programmable 28-key transmitter, infrared receiver, and software. $295. Computer Support Corporation, 214/661-8960.



PowerKey

PowerKey

Device that enables users to start up Mac SE from the keyboard using power-on key and shut down the machine using the Finder's Special menu. Can be programmed to turn on and shut down the machine at user-specified times. $99. Sophisticated Circuits, 206/485-7979.

Quiet Mac II/IIx Fan Controller

Fan controller for the Mac II and IIx helps reduce level of noise emitted from Mac. Fan speed is controlled by temperature servo circuits. $89.95. EuroComm, 619/471-9362.



The Supramodem 2400 Plus External

The Supramodem 2400 Plus External

Modem that supports MNP classes 2–5 and CCITT V.42bis error-correction and data-compression protocols. Modem automatically determines remote modem's type and adjusts rate and protocols for optimal communication. Hayes-compatible. $199.95. Supra, 503/967-9075.

SyncRouter

Router that allows remote



SyncRouter

AppleTalk networks to be interconnected via high-speed synchronous communication services. Lets users access computers, printers, file servers, and other remote devices transparently from the Chooser. $1895. Engage Communication, 415/358-0264.



TX/24

T19/24 and TX/24 Color Display Systems

24-bit-color display systems

(continues)

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The Computer Bowl

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The Association for Computing Machinery

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Stratus Computer, Inc.
Bob Frankston
Lotus Development Corporation
Edward Fredkin
Boston University
Russell E. Planitzer
Prime Computer, Inc.

West Coast Team:
L. John Doerr
Kleiner Perkins Caufield & Byers
Stewart Alsop II
P. C. Letter
Bill Gates
Microsoft Corporation
Charles House
Hewlett-Packard Company
Lawrence G. Tesler
Apple Computer, Inc.

"The Examiner"
Mitchell Kapor
ON Technology, Inc.

Judges:
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Sun Microsystems, Inc.
John William Poduska, Sr.
Stardent Computer Inc.

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The Computer Bowl is a project to benefit the educational programs of The Computer Museum, 300 Congress Street, Boston, MA 02110
For tickets and sponsorship information (617) 426-2800 (415) 327-4749.
Creative: Commonwealth Creative Group/Carol Patch • **Typography:** Composing Room of New England • **Separations:** H. K. Graphics

for the Mac II, IIcx, and IIci that use 16-inch and 19-inch Sony Trinitron monitors, and Apple's 32-bit color QuickDraw. T19/24 $8195; TX/24 $6495. E-Machines, 503/646-6699.

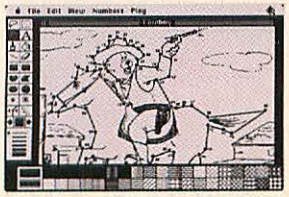
TidalWave 650

Removable, rewritable magneto-optical drive offers unlimited rerecording ability, archival storage features. $6290. Ocean Microsystems, 408/374-8500.

TurboPS/480

PostScript-compatible laser printer that features user-selectable printing at either 800 by 400 dpi or 400 by 400 dpi. $8495. NewGen Systems Corporation, 714/641-8600.

SOFTWARE



3 For Kids

3 For Kids

Learning program for children that includes a penmanship notebook with character editor, connect-the-dots game, and maze puzzles that can be altered with clip art designs. 1MB min. memory. $59.95. ISM, 301/527-1988.

Accounts Receivable Module

Accounts Receivable module to be added to Components accounting series that allows custom invoicing, and aging and sales analysis information for business customers. 1MB min. memory. $595. Satori Software, 206/443-0765.

Address Book Plus

Name-and-address-management software that prints output in a variety of forms including address book pages, phone lists, mailing labels, rotary-file cards, and envelopes. Can be ordered with leather binder. 1MB min. memory. $89.95; with leather binder $129.95. PowerUp, 415/345-5900.

Audiomedia

Compact-disc–fidelity digital-audio recording-and-editing system for the Mac II. Lets users add compact-disc–quality audio—including voice, music, and sound effects—to multimedia applications. 1MB min. memory. $995. Digidesign, 415/327-8811.

Bass Champ

Bass-fishing simulation software that lets user study maps, read LCR graphs, choose lures, check weather and water conditions, maneuver on the lake, and fight to reel in the big ones. Data files with actual topography of lakes throughout the United States may be purchased separately. 1MB min. memory. $49.95. Shadowfax Software, 515/472-6621.

Cat-Back

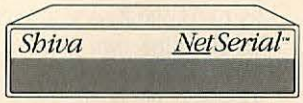
Software for backing up and cataloging software; can back up a modified file to one mirror-image set and prevent backup from eradicating previous versions of same file on other sets. Can back up selected files rather than backing up entire set. 512KE min. memory. $39.95. Master Manufacturing, 213/694-6861.

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Citadel

using a heritage-oriented character-generation system that includes character-image customizing. 1MB min. memory. $49.95. Postcraft, 805/257-1797.

Codecheck

Rule-based expert system that checks C and C++ source code for maintainability, portability, and compliance with in-house style guidelines. Identifies number of operators per expression and lines per statement; provides statistical analysis of code complexity and style. 512K min. memory. $495. Conley Computing, 503/244-5253.

Color Calibration Software

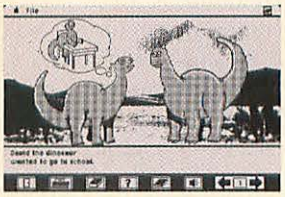
Color-calibration software for PostScript Imagesetters to produce film for multicolor publications. Provides independent control of gray-scale values and film density; provides a system of measuring page geometry to minimize registration errors. 128K min. memory. $495. Technical Publishing Services, 415/921-8509.

Comp-U-Fishing Log

Database lets fishers record and analyze fishing success by month and moon phase using factors such as type of fish, size, weather, tackle, lure, and fishing method employed. 512K min. memory. $39.95. McHenry Country Creative Communications, 708/639-9200, 800/247-6172.

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Automated-transaction and bank-authorization accessory for merchants who want to accept major credit cards. Verifies authorization for use of American Express, Visa, MasterCard, Discover, Diners Club, and Carte Blanche via BT Tymnet, Modular Data, and The Amherst Group networks. 1MB min. memory. $249. E. E. Companies, 508/653-6911.



David the Dinosaur

David the Dinosaur

One of a Talking Computer Book series; combines software and books for children ages 3 to 7 years. Uses graphic animation and digitized human voice to teach basic reading skills. Includes story book, an animated story program with human voice, animated dictionary, and quiz to test child's learned knowledge. 1MB min. memory. $39.95. ISM, 301/527-1988.

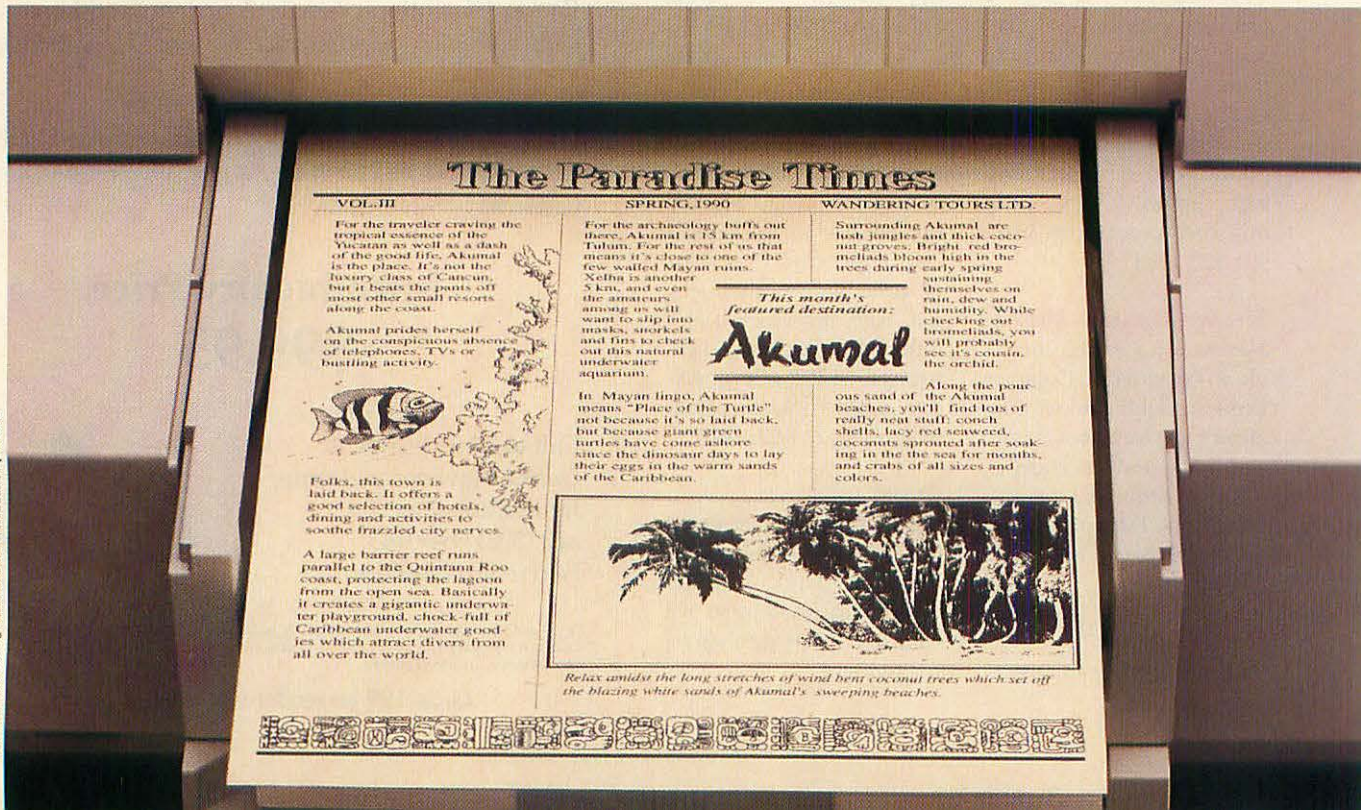
Desktop Help for Excel

Online manual for users of Excel 2.2. Covers more than 130 topics, 240 menu commands; has over 700 index entries, and offers cross-referencing feature. Reference information is accessible from Excel 2.2. 1MB min. memory. $79.95. Help Software, 408/257-3815.



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Easy Color Paint
Color paint program works in 16 or 256 colors, includes a window-lock feature, reads PICT and MacPaint files, allows user to create and save patterns. 1MB min. memory. $79. Creative Software, 201/665-9361.

EasyShare
File-sharing software that supports transparent file access while running in the background. File access is administered at two levels; volume level allows an entire disk volume to be published for network access, individual access lets users publish individual file folders. 1MB min. memory. $149 per server. ShirtPocket Software, 602/966-7667.

Empower I
Scaled-down version of Empower II security product. Controls access to the Mac by accepting only registered users, grants privileged access to security administrators, automatically locks access to Mac after a specified time, controls use of floppy disks, logs access attempts, and locks hard disks. 1MB min. memory. $165. Magna, 408/433-5467.



Expansions

Expansions: A Stokes Pattern Generator
Pattern generator that creates patterns within imported MacPaint documents or for export as PICT files. User can pause or modify a pattern as it develops. 1MB min. memory. $89.95. Pixel Pathways, 619/294-8686.

Extender DialogHandler
Addition to the Invention Software Development Series; contains more than 160 routines that decrease time required to write support code for functional modal dialog boxes. Comes with documentation, 5000 lines of example code, and full source code. 1MB min. memory. $189.95. Invention Software, 313/996-8108.

FancyFaces
Set of ten PostScript calligraphy typefaces. 1MB min. memory. $45. Ingrimayne Software, 219/866-6241.

Folder Locker
Utility that lets user password-protect individual folders so contents cannot be seen or accessed by other users or applications. Prevents deletion of locked folders and their contents. 1MB min. memory. $30. Software Brewing Company, 415/940-1946.

FontPak
Six new font packages each containing 20 to 26 typefaces selected from one of six categories: Futura, Designers, Serif, Sans Serif, and two advertising selections. 1MB min. memory. $299. Image Club Graphics, 403/262-8008, 800/661-9410.

GatorMail-Q
Software gateway between QuickMail and the Simple Mail Transfer Protocol (SMTP) that most UNIX

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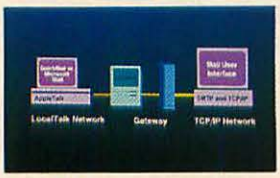
With a small size and a $1,195* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

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computers and TCP/IP networks use. Lets QuickMail users exchange mail with E-mail users of minicomputers and workstations on Ethernet. 1MB min. memory. $995 10 Mac users, unlimited UNIX users. Cayman Systems, 617/494-1999.

Individual Training for Word 4.0

Onscreen tutorial for Microsoft Word 4.0. Takes user through a series of step-by-step lessons and exercises. Provides training on the use of features such as automatic tables, formatting with rulers and style sheets, spelling checker and hyphenation, and page view. 128K min. memory. $69.96. Individual Software, 415/595-8855.

Jewish Computer Cookbook

HyperCard-based cookbook with kosher recipes in Jewish cookery. Does keyword searches by ingredient, classification, or recipe name. Automatically calculates ingredient amounts for different serving sizes and allows recipes to be printed and organized into complete menus. Includes French, Italian, Mexican, and Chinese recipes adapted for kosher cooking. 1MB min. memory. $39.95. Davka, 312/944-4070.

Jigsaw The Ultimate Electronic Puzzle

Electronic jigsaw puzzle that lets user select from four play levels ranging from advanced, with 60 pieces, to a level with 8 pieces that is suitable for children. 512K min. memory. $39.95. Britannica Software, 415/546-1866.

KeyPlan

Project-management software provides built-in outliner. Creates graphic representations of cash flow, costs, and resource allocation in scattergram, area graph, line graph, or bar chart format. Generates user-defined lists of tasks that may be sorted using AND/OR selections. 1MB min. memory. $395. Symmetry, 602/998-9106.

KidsCard

Collection of HyperCard stacks for three- to eight-year-old children who are beginning to learn about maps, clocks, calendars, and books. Includes puppet house, clocks, and atlas with various maps on which child can place "talking stickers." 1MB min. memory. $34.95. Kids Concepts, 503/629-5051.

Lappis

HyperCard-based landscape architectural plant-and-product information system. Lets landscape professionals store and retrieve technical and purchasing information on plant materials, irrigation, lighting, site furnishings, waterscapes, and structures. 1MB min. memory. $250. Landware, 714/832-8046.

MacMainFrame Portable and Mac IIci

IBM 3270 terminal-emulation and file-transfer software that enables the Macintosh Portable and IIci to communicate with mainframe computers running IBM 3270 protocol.

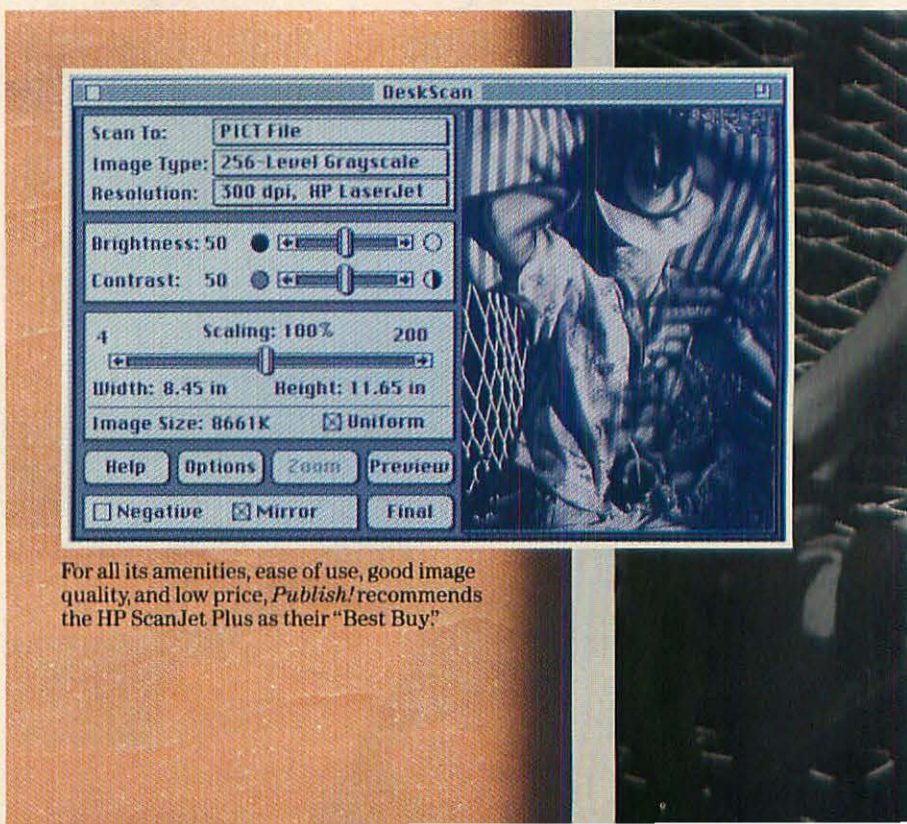
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1MB min. memory. Avatar, 508/435-3000.

Math Blaster Mystery

Mathematics activity program for children. Students play detective, using step-by-step approach to solve mathematical mysteries. 1MB min. memory. $49.95. Davidson & Associates, 213/534-4070.

Model-It

Visual programming tool for mathematical analysis of systems. Can be used to program algorithms using visual images on the screen rather than using standard computer language commands. 1MB min. memory. $295. Norris Software Systems, 615/588-5774.

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Small-business accounting software that has card file for automatically tracking customer, vendor, and employee information; electronic phone and address book with autodial; and automated To Do list that alerts you to overdue receivables, overdue payables, discounts about to expire, and inventory items that need to be reordered. 1MB min. memory. $99. Teleware, 800/322-6962.

Network Bundle for Macintosh

Networking software that includes AFP-applications, compatible TOPS 3.0 file-sharing software, InBox 3.0 with Mac administration software, and printing services. 1MB min. memory. $299. TOPS, 415/769-9669.

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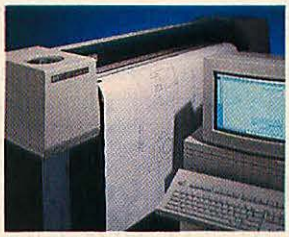
Family of four products that work with Caere's OmniPage OCR software. OmniDraft enables OmniPage 2.1 to recognize draft-mode text from dot matrix printers; OmniSpell recognizes text, reads most fonts regardless of size or column format; OmniProof provides on-screen comparison of original and proof-read page; OmniTrace converts bitmapped images and TIFF files into EPS format. 1MB min. memory. OmniProof and OmniTrace $150 each; OmniSpell and OmniDraft $100 each. Caere, 408/395-7000.

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Four training modules for use with Aldus FreeHand 2.0. Each module includes 90-minute audio cassette, practice disk, and command-summary card. Modules are Beginning Level, Intermediate Level, Creating Special Effects, and Precision Drawing Techniques. 1MB min. memory. $49.94 per module. Personal Training Systems, 408/559-8635.

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CD ROM containing 1500-plus high-quality black-and-white photo images supplied by Uniphoto Picture Agency, stored in TIFF. Categories of photos include abstract, agriculture, animals, buildings, lifestyles, medicine, scenic, and others. 512KE min. memory. $399. NEC, 312/860-9500.



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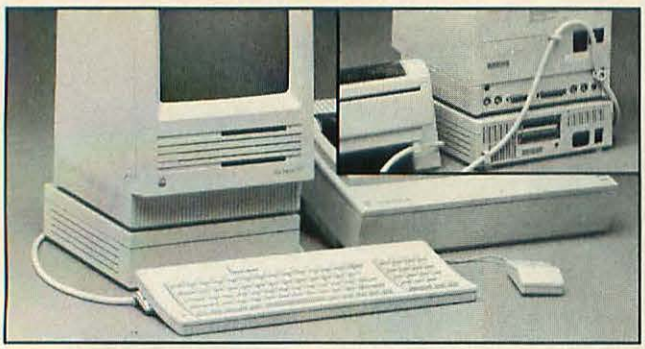
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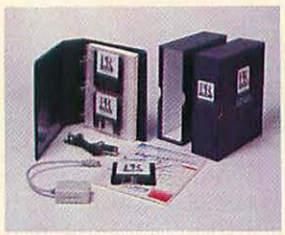
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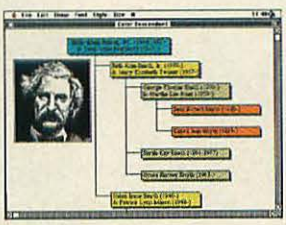
the background. Designed to support current and recent-model plotters from HP and Houston Instrument. Converts QuickDraw graphics to HP-GL, HP-GL/2, and DM/PL commands; can be extended to support other plotter languages. 1MB min. memory. $295. Palomar, 619/721-7000.



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Reunion

Reunion

Genealogy program creates a variety of genealogy documents, including descendant and pedigree charts up to 34 feet long. Family-group records automatically display all available information, omitting titles of categories where no information exists. 1MB min. memory. $99. Leister Productions, 717/697-1378.

RightWriter

Expert system that parses sentences to analyze business and technical writing. Program is designed to recognize and alert the writer to noun-verb disagreement, clichés, slang, passive voice, incomplete sentences, and jargon. 1MB min. memory. $95. RightSoft, 813/923-0233, 800/992-0244.

TTS Script

Software interpreter outputs PostScript files to non-PostScript printers. Supports entire Adobe typeface collection, operates as a network print server over AppleTalk network, has preview window with zoom capabilities and interactive PostScript editor. 1MB min. memory. $145. TeleTypesetting, 617/734-9700.

ACCESSORIES

Discwasher CDL 2 CD Laser Lens Cleaner

Kit for cleaning CD drives that have contaminated laser lens, and for regular maintenance. Includes cleaning unit with replaceable rotating fabric pads and cleaning fluid. $27.95. Discwasher, 708/678-9600.



Duskette

Duskette

Black neoprene head-saver that seals the Macintosh's floppy drive opening from dirt, dust, and other foreign elements. Can be customized to carry company names or logos. Available in 3½-inch and 5¼-inch sizes. $6.96. Veino Ventures, 603/425-7054.

(continues)

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Folding platform dolly for transportation of heavy equipment, cases, and shipping containers. Carries up to 400 lbs. Standard $89; large $149. Jensen Tools, 602/968-6241.



Indiana Jones And The Last Crusade Mousepad

Indiana Jones And The Last Crusade Mousepad

Mousepad that depicts characters from the film *Indiana Jones and the Last Crusade.* $15.95. The Computer Giftware Company, 818/500-7857.

Keyboard Cover

Transparent keyboard cover that adheres to the keyboard and helps shield it from dirt, dust, ashes, and spills. Fits most keyboard models. $25.95. Computer Coverup, 312/326-3000, 800/282-2541.

MacMover Carrying Case

Soft carrying case for Mac 512K, Plus, and SE made of black cordura nylon with ½-inch high-density interior padding on all sides, hardboard bottom, and interior nylon lining. $79. Jensen Tools, 602/968-6231.

Security Kit for LaserWriter II

Kit to help prevent LaserWriter theft. Includes two hasps, two hasp cover plates, two flathead screws, an 8-foot wire cable, and a padlock with three keys. $49.95. Kensington Microware, 212/475-5200.

Surgemaster

Six-outlet surge protector and power strip designed to protect computer equipment from high-voltage surges of up to 76 joules. Features a 6-foot power cord, six switched outlets, triple MOV protection, illuminated on/off switch, surge-protection indicator light, and 15-amp resettable circuit breaker. $29.95. Belkin Components, 213/515-7585.

BOOKS & VIDEOS

Macintosh Repair and Printer Secrets

Upgrade and repair guide for the Mac 128K, 512K, and SE models. Text explores reduced-cost alternatives to complete circuit-board replacement and component-level repairs. Written by Larry Pina. $32.95. MacMillion and Company, 800/257-5755.

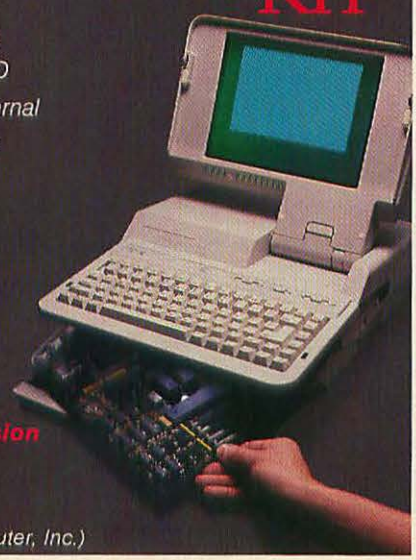
ScanJet Unlimited

Book that explains the art and science of scanning using the Hewlett-Packard ScanJet Plus. Provides an overview of fundamental scanning concepts and the use of ScanJet Plus for a variety of uses including optical character recognition. Written by Steve Roth. $24.95. Peachpit Press, 415/527-8555.

To have your product considered for inclusion in *New Products,* send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number (and two copies of software) to New Products Editor, *Macworld,* 501 Second St., San Francisco, CA 94107. We reserve the right to edit submissions.

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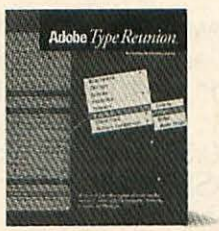
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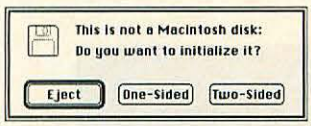
MULTIPLE SCSI DEVICE WOES, INVISIBLE FOLDERS, MACROMAKER ENVELOPES, AND MORE

BY LON POOLE

The messages "This is not a Macintosh disk. Do you want to initialize?" and "This disk is unreadable" may mean the disk drive or the disk media has failed, as I discussed last month and last December. Phillip E. Brown, a Mac consultant in Corvallis, Oregon, reports that these symptoms can also be caused by incompatibilities between older and newer versions of system software. He noticed a rash of these symptoms shortly after System 6.0 came out.

In experimenting with failed disks, Brown discovered that one sector of every disk had effectively become uninitialized. Apple Technical Support representatives acknowledged the problem, claiming it affects only disks initialized on older versions of system software and subsequently used with newer versions and that the disks must contain 100 or more small files. But Brown has noticed the same type of failures on disks with fewer files.

Fortunately, Brown has devised a solution to this problem. First he copies the failed disk to another disk using the Copy II Mac or Fast Copy utility software from Central Point Software (503/690-8090). He uses the Sector Copy With Format option to copy all of the good sectors but not the bad ones. Next he uses Apple's Disk First Aid utility to repair the copy he has made. Then he usually erases the failed disk and copies the recovered folders and files back onto it. To prevent the disk from failing again, he uses the latest system software and drags the recovered folders and files themselves—not the disk they're on—to the erased disk.



Unhappy Printer

Q I was a happy owner of a Mac Plus and a LaserWriter IISC. Adding a Cutting Edge 45-megabyte hard disk has threatened my happiness because I can no longer use the Mac if the printer is connected and turned off.

I use the printer for only 10 percent of the work I do on the Mac, so I don't want to shut everything down, power off, and disconnect the printer in order to turn it off. Apple tells me that a Mac works with an Apple or Rodime hard disk when a LaserWriter IISC is also connected but turned off. Can you suggest any remedy?

Michael Peltsmar
St. Louis Park, Minnesota

A I sympathize with your plight but can offer no suggestion to make you happy again except to replace your Cutting Edge drive. You've described a nasty but little-known side effect of chaining some brands of SCSI devices. This problem is becoming better known as more people connect printers, tape drives, video digitizers, and multiple hard disks to the SCSI port. I advise anyone who's shopping for a hard disk drive to make sure before buying that the drive (and the Mac) will work when other SCSI devices are turned off while still connected.



Smudged Duplex Printing

Q The tips for printing two-sided pages (*Quick Tips,* September 1988, February 1989, and July 1989) work fine for me except that the second pass through my LaserWriter IINT usually produces a gray-to-black smudge along the top edges of the sheets. How can I avoid this problem?

A The smudge is caused by the paper-feed mechanism. The paper-pickup roller, which applies pressure to help separate the pieces of paper in the input tray, picks up toner from the printed (face-down) side of the page and smears it on the top of the next sheet of paper. Apple claims there is no way to prevent this from happening. That is why the LaserWriter II owner's manual recommends using the manual-feed guide for duplex printing. Before giving up, experiment with different types and brands of paper. Also, try different brands of toner (if you can afford to).

Works Key Equivalents

Q As a fast and sloppy typist, I often find myself suddenly and inexpli-

(continues)



Circle 354 on reader service card.

cably at the beginning of a Microsoft Works word processing document. Neither Apple, my dealer, my Works manual, nor Microsoft help could tell me how to intentionally perform this useful trick. Eventually I discovered that pressing Control-A does it every time. How can I move the insertion point to the end of the document?

R. K. Multer
Foster City, California

A For this and other similar tricks, see the table "Works Navigation."

Dirty Fan

Q I installed a Kensington System Saver Mac fan in a brand new Mac Plus. Six months later the power supply burned up and I had to pay $200 to have it replaced. Naturally, I am extremely aggravated at Apple for selling a $1200 machine with a pitiful three-month warranty.

The real slap in the face came from the technician when I picked up my computer. He told me to toss my System Saver because it sucks in dust, which covers the electronics. The power supply gets covered with dust, overheats, and is usually the first thing to go.

My other Mac Plus has run flawlessly for over two years without a System Saver. Is the technician right? Does it do more harm than good?

George B. Shadel
Columbus, Ohio

A I doubt that a fan contributed significantly to your power supply failure. After all, most computer equipment keeps cool with fans.

Yes, a blanket of dust does trap heat next to the components and hastens their demise. Dust tends to accumulate faster with a fan than without, because the fan blows more airborne dust and smoke particles into the Mac. Some of those particles settle. This is true on all fan-cooled Macs, not just a retrofitted Mac Plus. However, I can't believe enough dust would accumulate in six months to toast a power supply. If so, I'd hate to see your lungs!

Although I don't think a fan will hurt, I don't think you need one unless you install an internal hard disk or some other internal upgrade. (Increasing memory capacity to 4 megabytes by changing SIMMs doesn't require adding a fan.) Plenty of people will disagree, citing anecdotal evidence damning the Mac Plus power supply. Maybe I'll come around to their way of thinking if my four-year-old fanless Mac Plus ever quits plugging along.

MacWrite 5.0 Warning

TIP: Don't run MacWrite 5.0 on a Mac IIci or Mac Portable. When you use the spelling checker, your document will get eaten one word at a time. Claris confirms that MacWrite versions 5.0 and below are incompatible with the IIci and the Portable. Too bad; I liked MacWrite 5.0. Claris recommends upgrading to MacWrite II for $65.

Irene A. Molnar
Phillipsburg, New Jersey

Safe Landing

TIP: In Spectrum HoloByte's Falcon, landing can be as challenging as accomplishing the assigned mission. The manual recommends using runway 9 for routine landing. The beginning of this approach is over hostile territory, however. At the higher levels of the

(continues)

WORKS NAVIGATION

Keystroke	Word processor	Database	Spreadsheet
Control-A	Top	First record	Top-left cell
Control-D	Bottom	Last record	Last cell used
Control-K	Up one window-full	Up one window-full, or previous record when viewing by Form	Up one window-full
Control-L	Down one window-full	Down one window-full, or next record when viewing by Form	Down one window-full

These key combinations are useful for moving around in Microsoft Works 2.0 documents. (Submitted by David Perlman of Rochester, New York.)

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Pictured above is the UPS 110SE for Macintosh SE, Plus, and 512 systems. APC features a complete line of UPS systems, software, and interface kits.

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Circle 31 on reader service card.

of SA-7 Grail shoulder-launched surface-to-air missiles may force you to alter course. Also, the low speeds necessary for a landing approach make the F-16 an easy target for any MiG-21s in the area. If the F-16 is damaged and you must eject, you will land in enemy territory where you may be captured.

The standard approach is useful when dealing with a low-fuel state, but there is an alternate approach that takes you entirely over friendly territory. If you must eject, recovery is guaranteed (assuming your chute is good). Begin the approach over the buildings used for the Milk Run on a 180-degree heading at an altitude of 10,000 feet. As the plane passes over the last building, turn right to a heading of 200 degrees, and begin a gradual climb to 15,000 feet. One mountain should appear in the distance. When a second mountain appears to the left and behind the first, turn sharply right to 360 (0) degrees. This should align the plane with runway 36. At this point, reduce the throttle and lower the flaps to establish a glide slope of -2 to -4 degrees. The slight disadvantage of landing without the guidance of the ILS beam is far outweighed by the advantages of landing entirely over friendly territory. Good hunting, and happy landings.

Charles W. Stewart, Jr.
Sunderland, Massachusetts

MacroMaker Prepares an Envelope

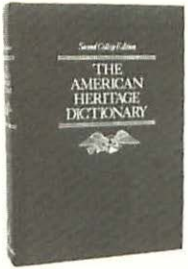
TIP: I use MacroMaker and Microsoft Word 4.0 to quickly prepare an envelope after I've written a letter in a standard business format. The macro moves the insertion point to the top of the document, searches for "1990" (all business letters include the date at the top), moves the insertion point down three lines, copies the next five lines (the address), opens a new document, pastes in the address, positions it correctly for a number 10 envelope, and finally, changes the text to a LaserWriter font.

To create a macro for envelopes to be printed on a LaserWriter II, record the following actions in Word 4.0.

1. Press ⌘-9 on the numeric keypad to go to the top of the document.

(continues)

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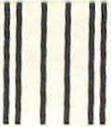
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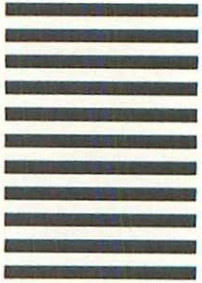
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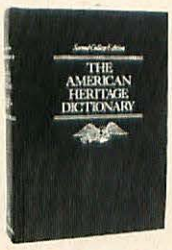
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2. Press ⌘-F (Find command), type **1990** as the text to find, and press Return to find the first occurrence.

3. Press ⌘-Period to dismiss the Find command.

4. Press the down arrow three times to reach the first address line.

5. Select the five-line address using the mouse.

6. Press ⌘-C to copy the address.

7. Press ⌘-N (New Document).

8. Press ⌘-V (Paste command).

9. Choose Page Setup, select the landscape (sideways) orientation, and click on the Document button.

10. Type **4 in**, press Tab, type **2.75 in**, press Tab, type **4 in**, press Tab, and type **1 in**. This sets the top, bottom, left, and right margins.

11. Click on the OK button to dismiss the document format dialog box.

12. Click on the OK button to dismiss the Page Setup dialog box.

13. Select all the text with the mouse, and choose a LaserWriter font from the Font menu.

The key to making this macro work is using 1990 in the date as a consistent reference point before selecting the text to be copied from the letter. Obviously, the macro will have to be recorded again after December 31 so that it will look for 1991.

James Shreeve
Woods Hole, Massachusetts

For best results, the windows of letters used for recording and playing back this macro should all be the same size, though they can be in different places on the screen. Also, all letters should have roughly the same contents above the line that contains the date. MacroMaker sometimes gets confused if the playback window is much smaller or larger than the recording window. It can also get confused if the playback window has more or less text above the date than the recording window had.—L.P.

Recycling MacMoney Categories

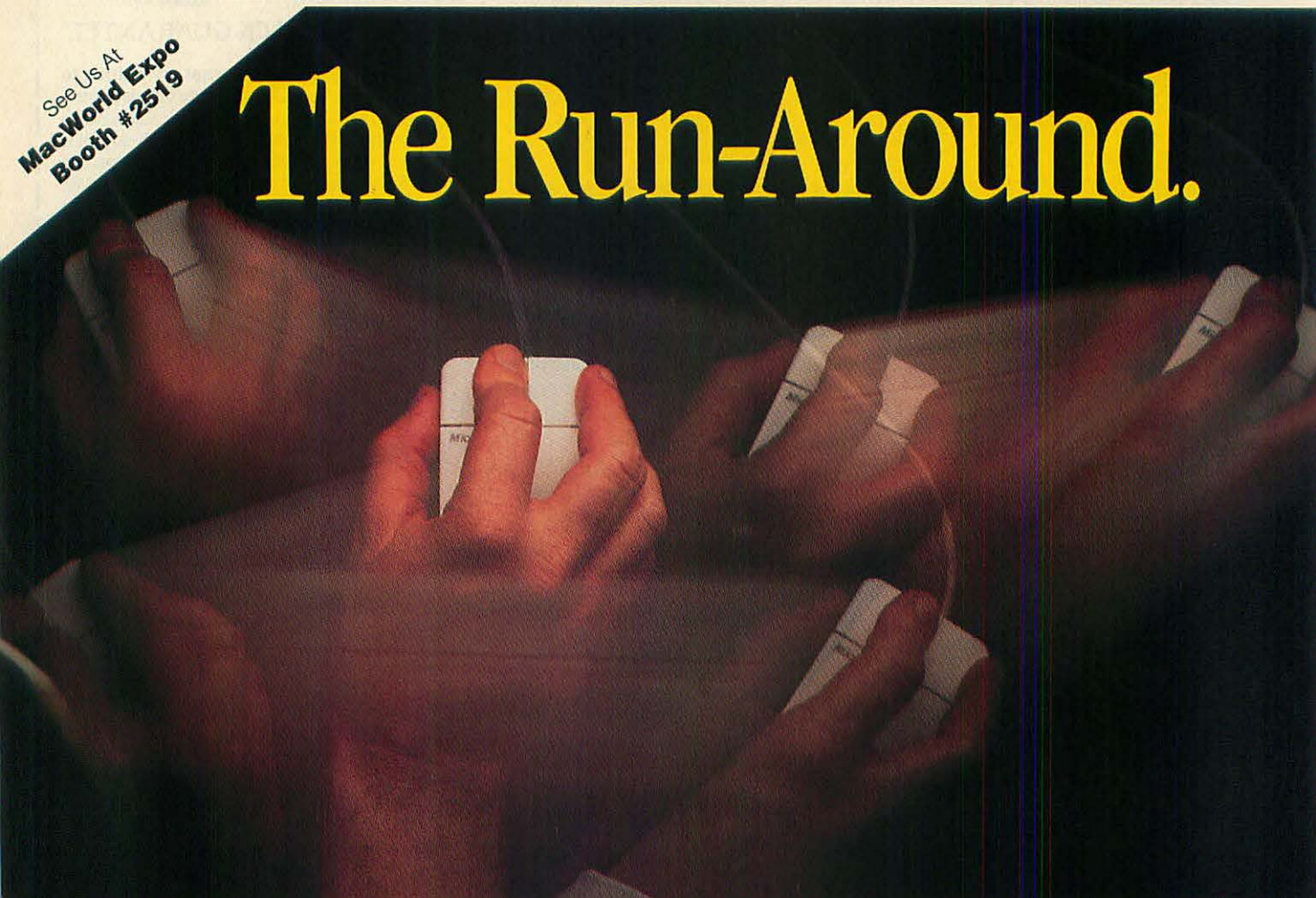
TIP: Categories in MacMoney 3.5 can't be deleted once a transaction has taken place using the category. Although you can't delete an unwanted category, you can recycle it. First, zero the unwanted category by editing transactions and reassigning amounts to other categories. Run a report to make sure no transactions use the unwanted category. Then rename the category for immediate reuse, or rename it to something like ">to be used." Later, instead of creating a new category, rename the recycled one.

Kathy Brown
Saunderstown, Rhode Island

Persuasion EPS Fonts

TIP: Aldus Persuasion 2.0 does not intelligently scan imported EPS graphics for downloadable fonts. This means you must manually download the fonts (for example, using Adobe's Font Downloader utility) to your printer before printing. You may not care to download fonts manually, or you may be unable to download because you're imaging slides on a non-PostScript device using Freedom of Press utility software. You can get Persuasion to download the fonts for you automatically. Just type some hidden text on the master slide, including at least one character for each font used in imported EPS graphics.

Ray Craighead
Olathe, Kansas



Invisible folders

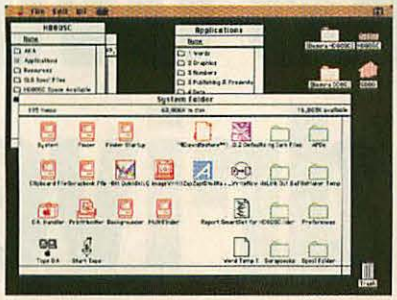
TIP: Recently, Ingemar Öhberg lamented the overpopulation of the System Folder (*Letters,* January 1990). He wished for "transparent folders," which the file system would ignore, and which he could use to reduce the number of items in his System Folder.

You can get the effect of transparent folders in the By Icon view or the Small Icon view. Open the System Folder, make it the maximum size your screen allows, and then stack similar document icons on top of each other. For example, stack all printer fonts in one pile, all control panel devices in another pile, and all start-up documents in a third pile, as shown in "Icon Piles." Obviously, you can't stack folders on top of each other but you can group them close together. When you have to remove something from the System Folder, switch temporarily to the By Name view or another text view.

Mark Powell
Los Altos, California

You can stack folders on top of one another by aligning them all to the same spot on the Finder's invisible grid. First, align one folder to the grid by pressing ⌘ and dragging the folder anywhere, even just a short distance away. Then press ⌘ and drag another folder toward the first folder. Release the mouse button when the second folder is near the first, but not so near that the first folder becomes highlighted. When you release the mouse button, the second folder snaps into position above the first folder.

Also, you can make the stacking process easier by grouping similar kinds of icons together. First, open the System Folder and choose By Kind from the View menu. Next choose Select All from the Edit menu and drag the selected group of icons from the System Folder window to the open System Folder icon. (If necessary, first drag the System Folder window so you can see the System Folder icon.) Then choose By Icon or By Small Icon from the View menu.—L.P.



Icon Piles

Reduce the clutter in your System Folder by arranging similar icons in piles. To see all items in the folder, switch temporarily to By Name view.

.

We pay from $25 to $100 for tips published here. Send tips or questions (include your address and phone number) to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107. Send electronic mail to CompuServe (70370,702) or MCI Mail (294-8078). All published submissions become the property of Macworld.

Lon Poole answers readers' questions and selects their tips for this monthly column. He has written many personal computer books, most recently the quick reference HyperTalk *(Microsoft Press, 1988), and has just finished a new book of Mac tips (to be published this summer by Microsoft Press),* Amazing Mac Facts.

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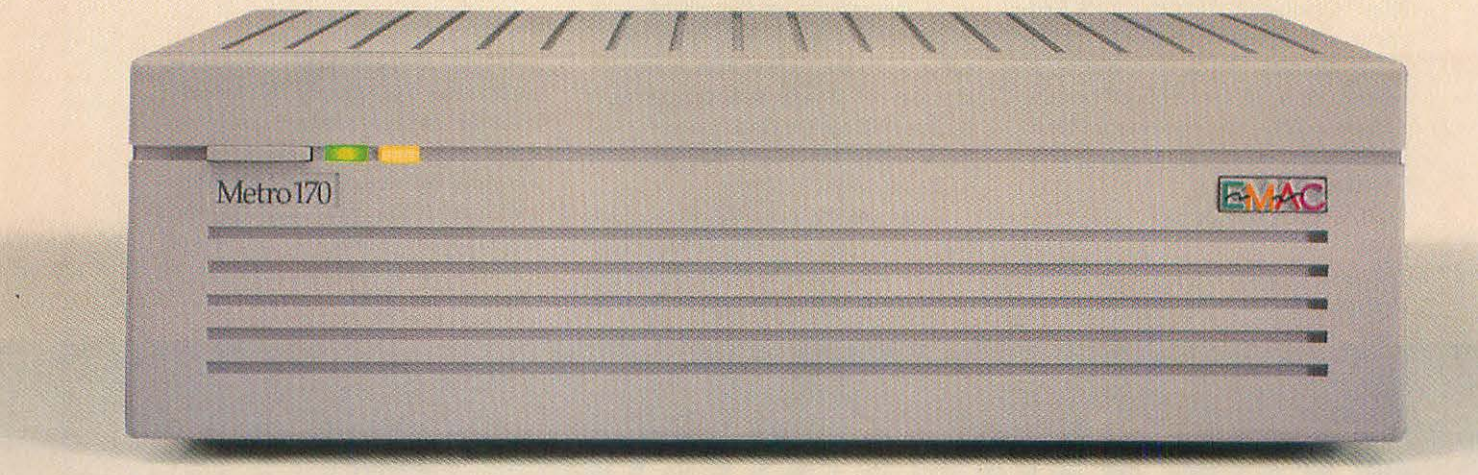
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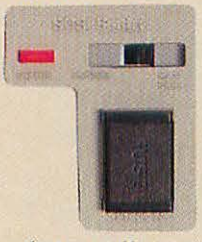
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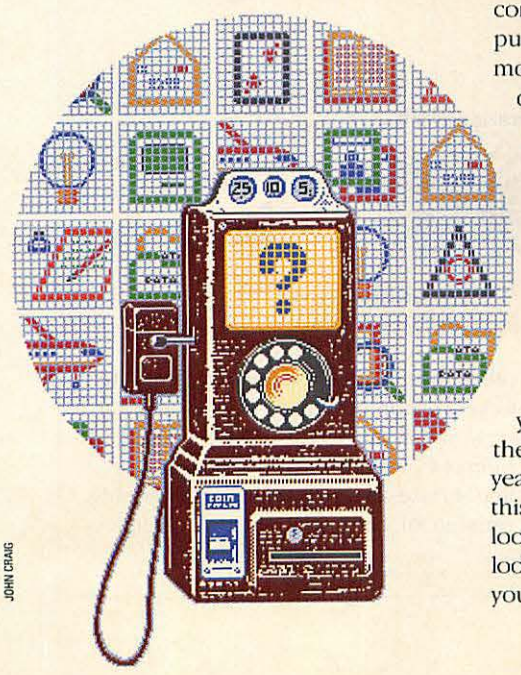
HOW TO

Getting Started with Communications

How to go online, and what you'll find there

BY JIM HEID

With some inexpensive hardware and software, your Mac can use a phone line to reach out and touch other computers. You can exchange files with a colleague at the office or a friend in another city. You can dial up *bulletin boards,* electronic meeting places for hobbyists and user group members. You can send *electronic mail* to friends and coworkers, even if they don't have computers. You can transmit documents to desktop publishing service bureaus for output on their typesetting equipment. And you can subscribe to any number of *information services* from which you can access current news and vast libraries of free and nearly free software.



JOHN CRAIG

Computer bulletin boards and information services have been around for years, but until recently they didn't take advantage of the Mac's appealing graphics and easy operating style. Information services were designed to communicate with any brand of computer, and that meant forgoing the mouse and returning to the dark ages of typed commands such as **cat/des/age:90/key:Mac.**

That's changing. The Mac has inspired a new generation of communications services that you control using icons and all the other trappings of the Mac's graphical interface. Some clever programmers have also managed to graft friendly interfaces to older, text-oriented services. If you were skeptical about entering the telecommunications world a few years ago when I first examined it in this column, it's time for a second look. This month I'll explore the new look of Mac communications and what you need to go online.

Private Lines and Party Lines

You can telecommunicate on two basic levels: directly with another microcomputer, or through an intermediary such as an information service or bulletin board (see "Two Ways to Connect"). With the direct route, you arrange the communications session ahead of time by determining who will call whom, and then setting up your communications gear accordingly. A business traveler might use this technique to transfer a file to a colleague at the home office.

Communicating directly costs only the phone call, but it forces you to contend with several communications technicalities, such as the choice of a *file-transfer protocol,* which causes data to be "proofread" to eliminate garbled files as it's received. Plan on making a troubleshooting call to iron out the wrinkles. Also plan for some scheduling predicaments: you and your fellow communicator should be at your machines to ensure that things go smoothly, and that's inconvenient if you're in different time zones.

An information service is a more convenient and more flexible way to communicate. When connected to one, your Mac is talking to a room full of refrigerator-size *mainframe* computers. Those mainframes may, in turn, be talking to thousands of your fellow subscribers simultaneously, divvying up their time between each one. *(continues)*

It's called *timesharing,* and it's one of the oldest ways of getting computer power to individuals and small companies. (Indeed, some information services, including the largest, CompuServe, began life years ago by selling mainframe computer time to businesses for payroll management and similar tasks.)

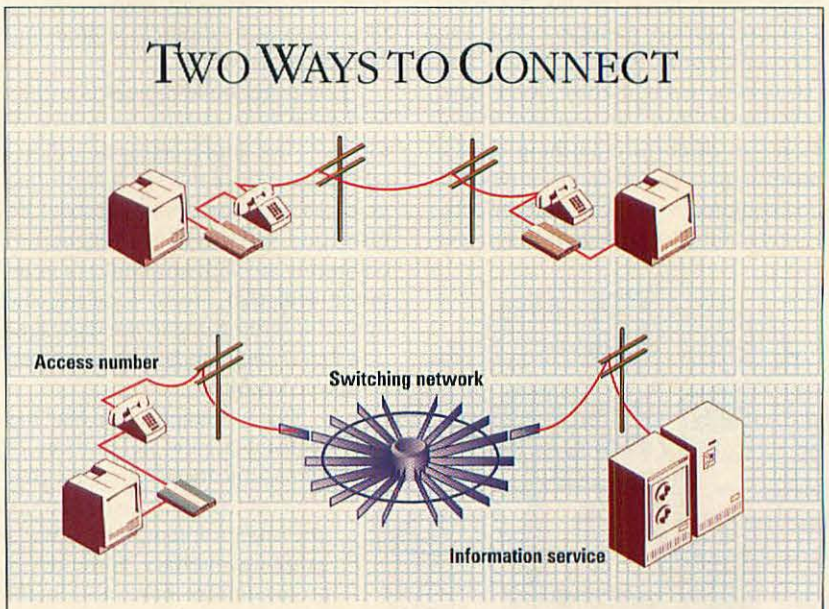
Information services, especially ones with graphical *front ends*—Mac software programs that help you access and navigate through the service—provide some insulation from the cold world of communications technicalities. And information? It's there, too—in quantities that may overwhelm you at first and cost you a fair sum in *connect charges* after that.

Information, Please

An information service is a post office, library, stock broker, travel agent, meeting hall, computer club, and software flea market all rolled into one phone call. Here's what you'll find on most services.

- *Electronic mail* You can exchange messages and disk files with other subscribers in a flash, and cut your express courier bills in the process. Simply *upload* files and messages to the service; recipients can *download* them at their convenience. With many services, you can exchange *E-mail* with other subscribers only. Some services, however, provide *gateways* to other services. CompuServe and Connect users, for example, can exchange mail with MCI Mail subscribers. Other services, including MCI Mail and GEnie, can combine E-mail with paper mail: transmit your message to the service, and it's laser printed and then mailed or delivered by courier. MCI Mail can also send your E-mail to any fax machine. (For more details on E-mail, see "Getting Started with Electronic Mail," February 1989.)
- *News* Most services offer up-to-the-minute news from wire services such as Associated Press, United Press International, and Reuters; and from newspapers such as the *Wall Street Journal* and the *Washington Post*. The NewsNet information service specializes in government and industry news, offering the full text of hundreds of specialized newsletters. Most services let you locate items of interest by typing sets of *keywords*. For example, the keyword phrase "offshore and regulation" would snag stories on offshore drilling laws. Some services also let you set up electronic clipping folders: specify your keywords, and the service constantly scans the wires for you and saves stories containing them. When you go back online, you'll find the relevant stories waiting.
- *Research* CompuServe has the largest electronic research room of all the major consumer information services. You can summon detailed information on nearly 10,000 publicly traded companies and demographic reports on thousands of towns and cities. Also available are data from the Bureau of the Census, transcripts of television news programs, thousands of articles from *Consumer Reports* and numerous computer publications (including *Macworld*), and online versions of *Books in Print* and *Who's Who*. And on several services, you'll find all ten million words of *Grolier's Academic American Encyclopedia*.
- *Travel information* Most services have online travel agents that can help you plan trips. On CompuServe, you can search for fellow subscribers willing to swap houses for vacations. Frequent flyers can access the Official Airline Guide (OAG) database, the same flight-information service travel agents use.
- *Shopping* Yes, you can say "charge it" online. CompuServe and GEnie both have online malls containing music and video stores, florists, pharmacies, and cookie shops. On CompuServe you'll find the Boston Computer Exchange, a network that matches used computer equipment with potential buyers. GEnie and America Online offer gateway access to Comp-U-Store, which offers member discounts on 250,000 products.
- *Special-interest forums* Here you can communicate with other subscribers on a wide range of issues, including technical questions on using Mac hardware and software. You can also download megabytes of software, including fonts, scanned images, digitized sounds, utilities, desk accessories, and the latest version of the Mac's

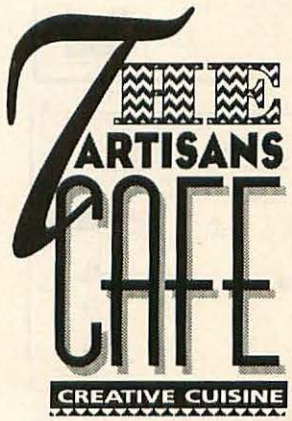
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One way to communicate is to call another modem-equipped computer directly (top). Most people, however, use information services as intermediaries. To connect to a service, you dial the *access number* closest to you to connect to a *switching network,* which, in turn, communicates with the service's computers. Some services operate their own switching networks, while others use commercial networks such as Telenet, Tymnet, and in Canada, Datapac.

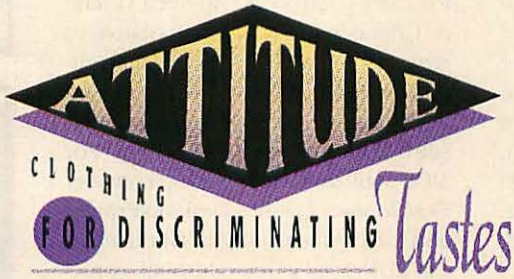
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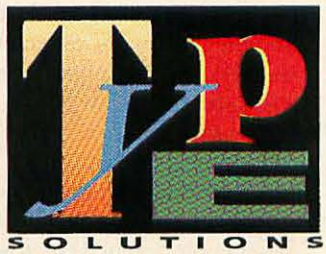












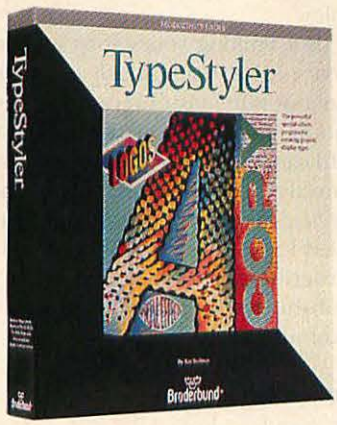
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system software. Most programs are free, but some are *shareware.* You're expected to pay a modest fee (usually under $25) if you decide to keep a shareware program. Most major software and hardware firms also operate forums, offering technical tips and program updates. All the major services have lively Mac forums, but CompuServe's is the largest.

Choosing a Service

Choosing an information service involves assessing your budget as well as your information needs and then deciding how important a Mac-like interface is to you. Initial membership costs and connect charges vary depending on the service and when you use it. With most services, evening and weekend rates are lower than daytime weekday rates. One exception is the Prodigy service, a joint effort between IBM and Sears (you've heard of them), which charges a fixed rate of $9.95 per month instead of an hourly rate. But Prodigy lacks a Mac-like front end, so you pay for its potentially lower cost by forgoing much of the Mac's friendliness. (See "At Your Service" for information on each service's sign-up and connect charges.)

Your online intentions should be a major factor in your choice. Businesspeople might lean toward MCI Mail, Dow Jones/News Retrieval, and NewsNet, while Mac hobbyists who want access to shareware may find CompuServe or GEnie more appealing. Businesses and organizations might consider Connect; although it's sold to individuals, it's primarily geared toward organizations wanting to set up forums for their members. Connect can even create customized windows and icons for your group. A sales staff, for example, might use a forum whose icons let them file sales reports and read news and product information from the home office.

Then there's the interface issue. Some services take better advantage of the Mac's operating style than others (see "The Face of Communications"). America Online takes the prize, with an attractive and easy interface that makes excellent use of the Mac's personality traits. (For more information on America Online see *Reviews,* April 1990.)

The Connect service sports an attractive interface, too, with another bonus: it's also available for IBM PCs and compatibles. The service looks and works the same on both systems, making it a good choice for businesses that mix Macs and PCs. (A PC version of America Online is also in the works.)

As for CompuServe, MCI Mail, Dow Jones, and GEnie, their interfaces are, well, not so pretty. All are text-oriented services that require typed commands in response to text menus. However, Mac front-end software is available for each one. CompuServe's Navigator provides point-and-click access to some (but not all) of the service's nooks and crannies. Navigator can't compare to America Online or Connect, but it is an alternative to typing commands. (A new Mac front-end program called CompuServe Information Manager is due out this year; see "CompuServe Makeover"). For MCI Mail and Dow Jones, consider Dow Jones Software's Desktop Express and E-Z Online packages. GEnie users can download a free (although somewhat crude) program called MacGEnie from the service's Mac forum. More-polished front-end software is expected for GEnie this year.

My personal picks? If you want to subscribe to just one service, make it CompuServe. Its interface isn't the prettiest, but its range of services is unmatched. It also boasts the largest number of subscribers: 550,000 compared to GEnie's 180,000, Connect's 20,000, and America Online's roughly 35,000. If an easy, Mac-like interface is important to you, choose America Online.

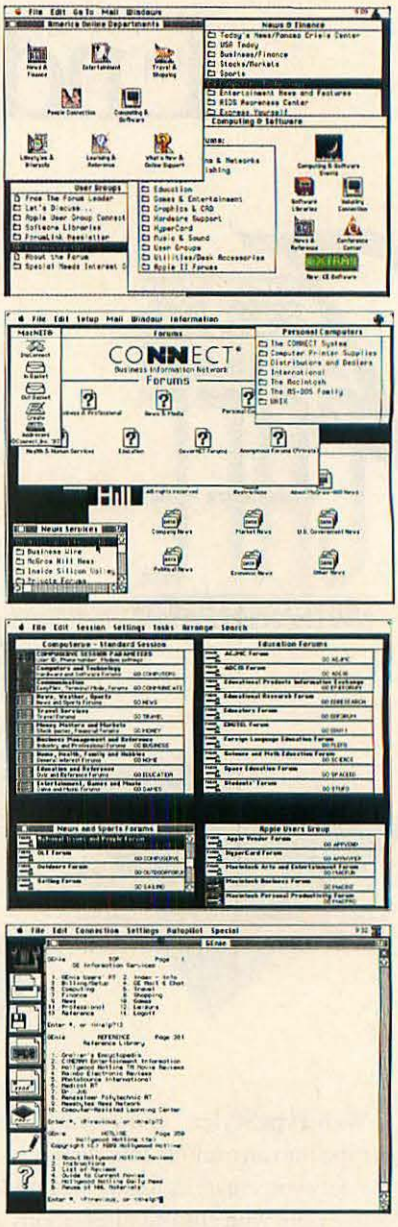
But limiting yourself to just one service is like reading only one newspaper or watching only one television station. Because you use the same hardware (and in some cases the same software) to communicate with each service, and you're generally only billed for the time you spend online, subscribing to additional services probably won't greatly increase your communications expenses.

Required Hardware

A computer's link to the online world is a *modem,* which translates data into audible squawks that the phone lines can carry. At the other end of the line, another modem converts the sound back into digital data.

Most modems are small external boxes that you attach to the Mac's rear-panel modem connector and a telephone jack. The Mac Portable and the SE and II families can also accommodate *internal modems,* which live inside the case, providing more porta-

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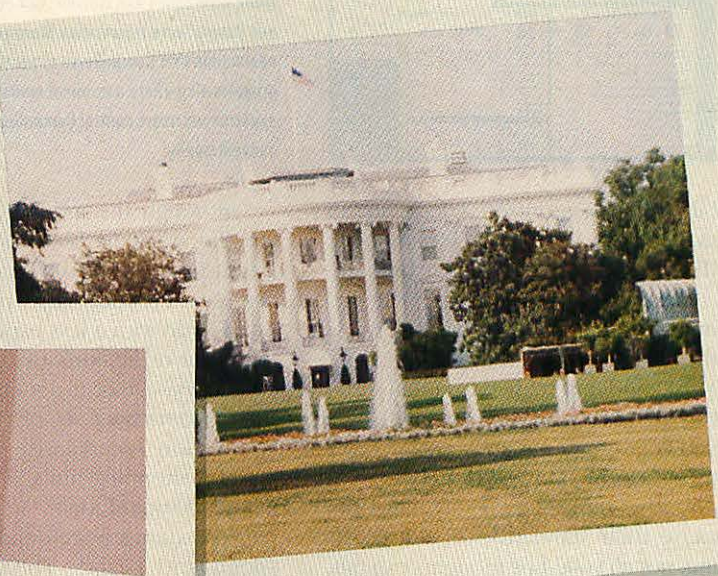
The Face of Communications
Four information services, from top: the Mac-like America Online; Connect Business Information Network; CompuServe, as seen through CompuServe's Navigator front-end program; and GEnie, a text-only service, seen here through Hayes's Smartcom II.

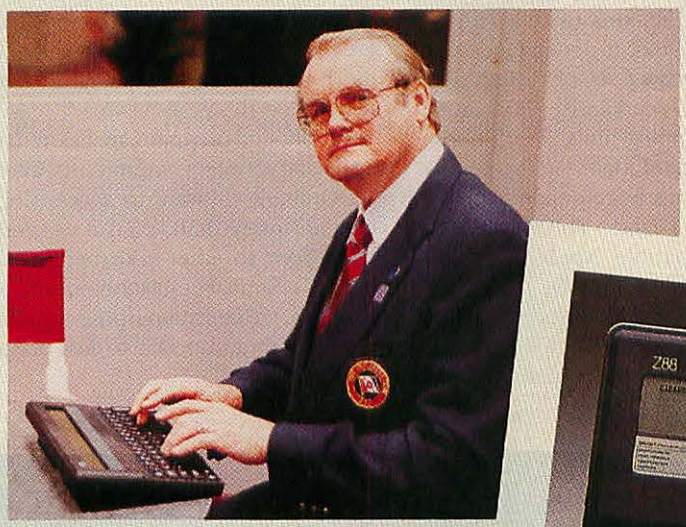
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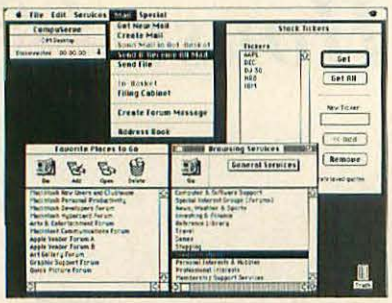
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CompuServe Makeover

The CompuServe Information Manager, in prerelease form and due for release later this year, is a friendly facade for CompuServe. You choose menu commands and double-click on forum names, and CompuServe Information Manager sends the commands that CompuServe expects to see. The program also offers a terminal mode that lets experienced users control CompuServe conventionally.

bility and a less-cluttered desk, but no *status lights,* which help you monitor the flow of data between machines.

Place of residence aside, the primary difference between modems is the speed at which they transfer data. Most modems transmit data at 1200 bits per second (bps) or 2400 bps. 9600-bps modems are available, but most information services don't support this transmission rate. And because their standards are still evolving, not all 9600-bps modems can talk with each other. For general-purpose communications, a 2400-bps modem is your best bet. (For more on 9600-bps modems, see "Communicating at Speed," *Macworld,* July 1989.)

Although the industry standards are the ruggedly built (and pricey) Hayes Smartmodems by Hayes Microcomputer Products, you'll probably do just as well with a less expensive modem. But make sure it's fully *Hayes-compatible*—that it understands the *Hayes command set* of dialing and connection commands. (For more modem shopping hints, see "Choosing a 2400-bps Modem," in this issue.)

A modem's price depends on its speed and brand. The 1200-bps, Hayes-compatible Apple Personal Modem retails for $279; the faster Apple Modem 2400 lists for $499. Hayes-compatible 2400-bps modems from firms such as Prometheus, Anchor Automation, and Practical Peripherals often sell through mail-order firms for under $200. Some modems also include *communications software,* which tells the modem when to dial and hang up and helps you manage everything in between.

Software for Communicating

Communications software falls into two basic categories: customized front-end programs such as those used by Connect and America Online (as well as Navigator and Desktop Express); and *terminal emulation* programs such as Hayes's Smartcom II, Software Venture's MicroPhone II, and The FreeSoft Company's White Knight, formerly the shareware program Red Ryder.

Front-end programs are tailored to a specific service; you can't use America Online's software to access Connect any more than you can use your front door to enter your neighbor's house. Terminal-emulation programs, however, are general-purpose communicators: they can talk to just about

(continues)

AT YOUR SERVICE

	America Online	CompuServe	Connect	GEnie	Prodigy
Sign-up fee*	none	$39.95 (includes $25 connect time)	$99.95 (includes one free hour)	$29.95	none
Communications software included	yes	no	yes	no	yes
Prime hours	6 a.m.–6 p.m.	—	7 a.m.–7 p.m. weekdays	8 a.m.–6 p.m.	†
Prime-time connect charge‡	$10 per hour (all speeds)	$12.80 per hour (all speeds and times)	9600 bps, $14 per hour other speeds, $10 per hour plus 3¢ per 1000 characters sent	$18 per hour (all speeds)	—
Discount hours	6 p.m.–6 a.m. plus weekends and major holidays	—	7 p.m.–7 a.m. plus weekends and major holidays	6 p.m.–8 a.m. plus weekends and major holidays	—
Discount connect charge‡	$5 per hour (all speeds)	—	9600 bps, $7 per hour other speeds, $5 per hour plus 2¢ per 1000 characters sent	300 bps, $5 per hour 1200 bps, $6 per hour 2400 bps, $10 per hour	—
Monthly fee	$5.95 (includes one free discount-time hour)	$1.50 $10 for Executive Service (provides additional options)	none	none	$9.95

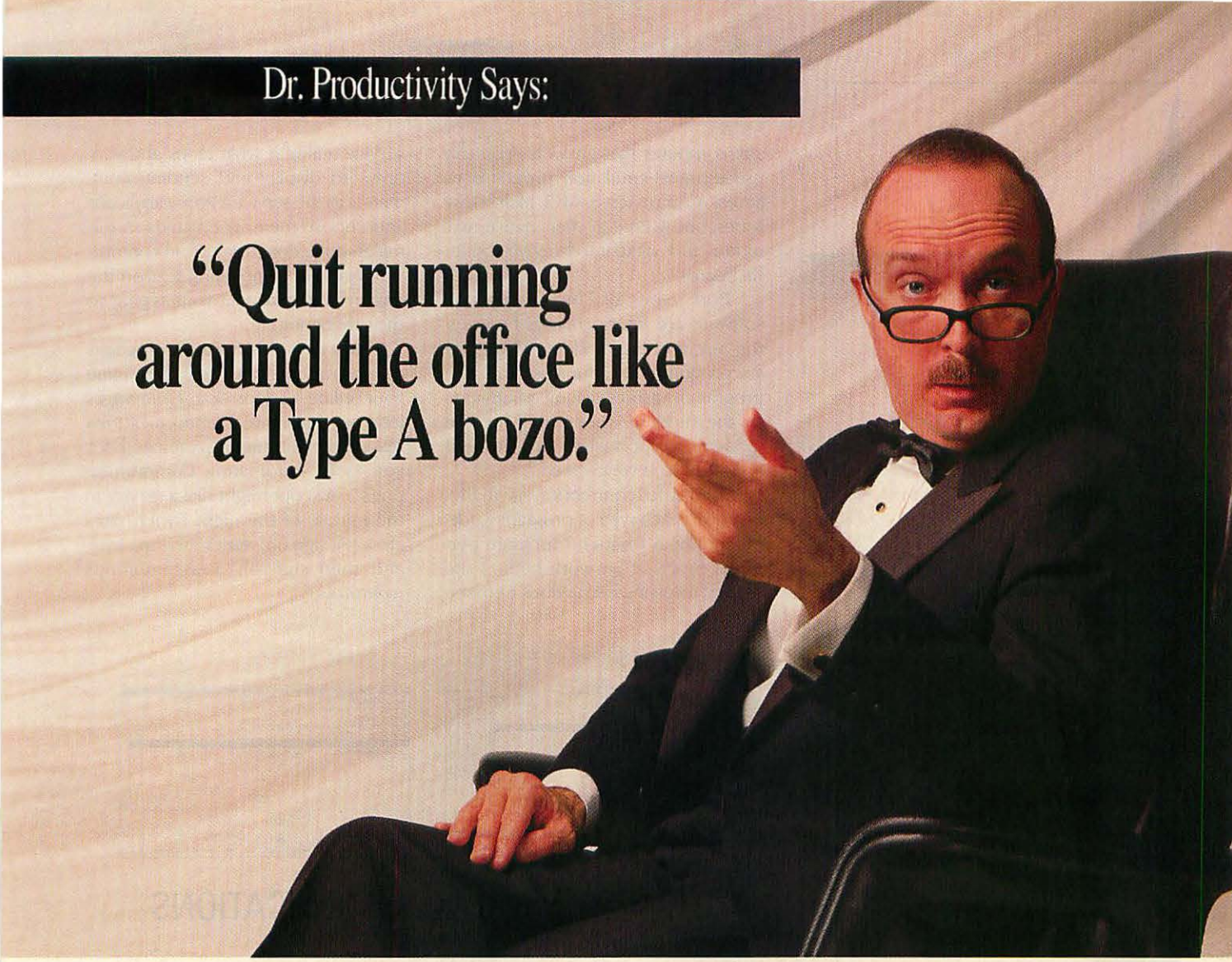
**Many modems and communications-software packages include coupons offering reduced or no sign-up fee. Also, Connect offers volume discounts.*

†The Prodigy service is available from 7 a.m. to 1 a.m. eastern standard time, 6 a.m. to midnight local time elsewhere.

‡Charges listed do not include switching network fees or local phone charges, if any.

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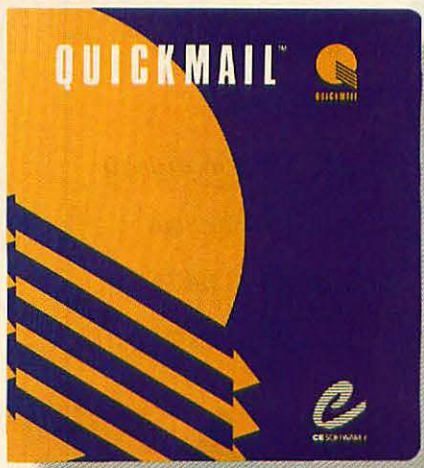
"Want a second opinion? Ask the critics."

"As we said before, CE Software's QuickMail is the best electronic mail package on the Mac, and the latest updates have only increased its lead over Microsoft Mail and InBox." MacWeek, 8/8/89

"Rather than exercising 20-20 hindsight, start out with QuickMail." Dave Kosiur, Connections, July-August/89

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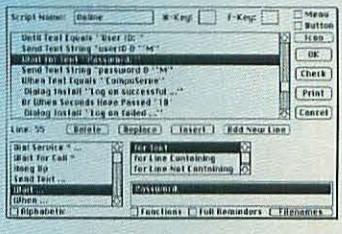
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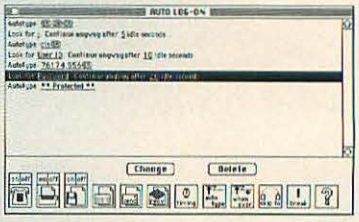
any computer that answers. You can use terminal-emulation programs to access CompuServe, MCI Mail, Dow Jones, and GEnie in their native text modes and to tap into hobbyist bulletin boards.

Both types of communications software are intermediaries between the Mac and the modem. When you start a communications session, the program transmits dialing commands to the modem, then waits for the modem to report when a connection is made and at what speed.

After the connection is made, however, each type of program works differently. A front-end program performs much of its work behind the scenes, receiving instructions from the service telling it what icons and windows to display and sending commands to the service as you click icons and choose menu commands. A terminal-emulation program, in contrast, simply displays incoming text on the screen and transmits your typing to the other computer.

Most terminal-emulation programs also provide features that streamline your online sessions. *Script languages* let you automate communications sessions by transmitting commands for you (see "Automating Communications"). A script might dial a service in the middle of the night (when rates are low), sign on, retrieve waiting mail, and then sign off. Less ambitious *(continues)*





AUTOMATING COMMUNICATIONS

Script languages let you automate communications sessions by transmitting commands to the service that you would otherwise have to type. Here are portions of two scripts that sign on to CompuServe—the script as it appears in MicroPhone II (left), and in Smartcom II (right). Both scripts wait for certain incoming text (such as "Password:") and then transmit text you specify as if you typed it.

Smartcom II's script language is easier to use but less powerful than those of MicroPhone II, White Knight, and Prometheus Products' Acknowledge. The latter three programs also offer *learn modes:* they can watch over your shoulder and record scripts based on your actions. You can use the resulting script as is or modify it by adding a delay or additional features. MicroPhone II and MacKnowledge also provide features that let you execute scripts one step at a time—useful when a script isn't behaving as you expected.

The script languages in MicroPhone II, White Knight, and Acknowledge also let you create custom pull-down menu commands and icons that, when chosen, execute scripts. You could use these features to create your own customized front end for a text-oriented service such as CompuServe. Prometheus's MacKnowledge software does just that for not only CompuServe, but also for Dow Jones/News Retrieval, MCI Mail, GEnie, and other services.

Creating graphical front-end software isn't a trivial task. For one thing, you need familiarity with basic Mac programming concepts such as creating and responding to choices in pull-down menus and dialog boxes (see "Getting Started with Programming," *Macworld,* December 1989). What's more, you need to anticipate every event that might occur during a session—from data-garbling static to busy signals. If you don't, your scripts will operate unreliably.

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scripts might simply take you to a specific forum when you choose a menu command or type a ⌘-key shortcut. With careful scripting, you can create your own front end for text-oriented services. (Indeed, Dow Jones's E-Z Online software was created using the powerful scripting language in Prometheus Products' MacKnowledge.)

Hayes's Smartcom II is my favorite terminal-emulation program. It's elegantly designed and easy to use, although it lacks some of the features found in MicroPhone II and White Knight. If you plan to explore text-only services and bulletin boards extensively, you might be better served by MicroPhone II or White Knight.

Toward the Online Age

Communications is slowly becoming a consumer commodity. Many banks offer bank-by-modem services, and the Internal Revenue Service is expanding a test program wherein taxpayers can file their returns by modem and get their refunds faster. But to me, the real online age won't arrive until telecommunications meets television. Imagine looking up the latest online news and seeing a television news report instead of a window full of text, or browsing an online encyclopedia and not only reading about Martin Luther King Jr. but also seeing him give his most famous speeches. This kind of interactive news and video exists today, thanks to videodiscs and HyperCard, but it's unlikely to meet the online world for some time.

This doesn't mean today's world of communications doesn't have a great deal to offer. It does, and I encourage you to sample it. If you do, drop me an E-mail note and let me know how you use it. On CompuServe, I'm 76174,556; on America Online and Connect, I'm JimHeid; and on MCI Mail, JHEID. Ⓜ

See *Where to Buy* for contact information.

Jim Heid is a Macworld *contributing editor who each month focuses on a different aspect of Mac fundamentals. His latest book, coauthored with Peter Norton, is* Inside the Apple Macintosh, *an advanced user's guide to the Mac, published by Brady Books.*

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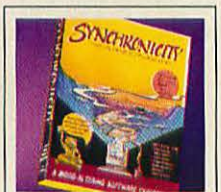
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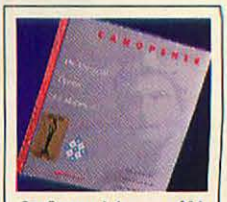
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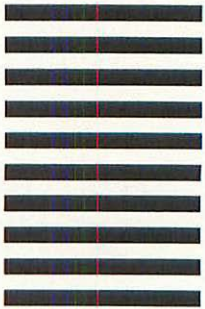
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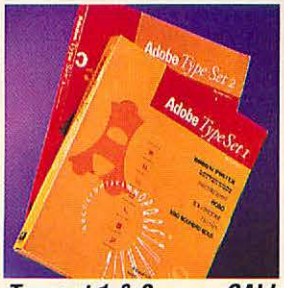
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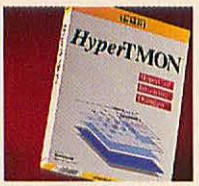
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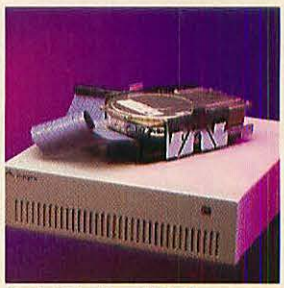
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Marathon 030 Upgrade CALL

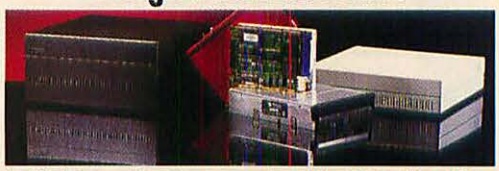


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Our best line of data storage devices, including: Integra external hard disk drives (available in capacities from 20 to 330 megabytes), Flipper 150mb tape backup, Flipper 44mb removable cartridge drives, Sonar 600 removable optical read-write disk drive, and many more.

Dolphin Hard Disks see listings

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CDC 135 Mb CALL
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Quantum 40 Mb 410.
Quantum 80 Mb 648.
Quantum 105 Mb 758.

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Seagate 20 Mb (28 ms) 295.
Seagate 30 Mb (28 ms) 355.
Seagate 45 Mb (28 ms) 398.
Seagate 60 Mb (28 ms) 530.
Seagate 80 Mb (28 ms) 598.

5.25" Hard Disks

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CDC 150 Mb 1,398.
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CDC 300 Mb H (10 ms) .. 2,198.
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Micropolis 150 Mb 1,148.
Micropolis 330 Mb 1,895.

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Micropolis 675 Mb 2,938.

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Seagate 80 Mb 495.

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Products & advice on your phone 1-800-248-0800

Antic Software
Business Forms - PageMaker
Vol. 1 Human Resources 27.
Vol. 2 Inventory/Stock 27.
Vol. 3 Operations/Admin. 27.
Flexform Business Templates
Volume I or II 47.

ASD Software
Fileguard 128.



Fileguard $128.

ASD Software
Enables you to protect documents, hard disks, or applications against unauthorized access and the risk of accidental deletion.

Ashlar
Vellum 699.

Ashton-Tate
dBASE Mac 294.
Full Impact 248.
FullWrite Professional 255.

Beagle Bros Inc.
FLASH CALL

Berkeley System Design
After Dark 24.
Stepping Out 2.01 50.

Blyth Software
Omnis 5 Incrementer 74.
Omnis 5 Single User 345.

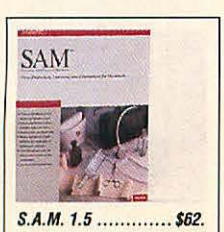
Bootware Software
ResuméWriter - Pro 58.
ResuméWriter - Student 18.

Borland International
SideKick 2.0 67.
Turbo Pascal 1.1 67.
Turbo Pascal Tutor 1.0 49.

Bright Star Technology
Hyper Animator 1.5 98.
Interface 229.

Brøderbund
PosterMaker Plus 34.
Print Shop 35.
TypeStyler 119.

Caere
OmniPage 2.0 549.



S.A.M. 1.5 $62.

Symantec
Eddy Award winning antiviral program. The first comprehensive solution to the threat of Macintosh computer viruses.

Casady & Greene
AME 1-10 Users 978.
AME 1-5 Users 584.
AME Single User 179.
QuickDEX 31.

CE Software
CalendarMaker 3.0 31.
DiskTop 4.0 w/GOfer 64.
In/Out (1-10 User) 188.
In/Out (1-5 User) 128.
MockPackage Plus 31.
QuicKeys 1.2 64.
QuickMail 2.2
1-5 Users 210.
1-10 Users 315.
1-50 Users CALL
Administrator Pack CALL
Single User Pack CALL

Central Point Software
Copy II Mac 7.2 20.
PC Tools Deluxe 45.

Chang Labs
C.A.T. 225.

Check Mark Software
Cash Ledger 115.
MultiLedger 1.3 235.
Payroll 175.

Claris
Claris Cad 594.
FileMaker II 219.
MacDraw II 294.
MacPaint 2.0 94.
MacProject II 2.0 369.
MacWrite II 169.
...w/FileMaker II Bundle 295.
...w/MacDraw II Bundle 368.
SmartForm Designer 295.

Computer Associates
Simply Accounting 1.1 218.

Connect
Connect Business Info 2.0 ... 94.

Connectix
Virtual - Mac II 124.
Virtual - Mac II w/PMMU ... 194.
Virtual - SE/30, IIx, IIcx 124.

Craig Management Systems
ScheduleMaker 299.

Cricket Software
Cricket Color Paint 178.
Cricket Graph 1.31 115.
Cricket Paint 65.
Cricket Presents 2.0 285.
Pict-O-Graph 104.

Custom Applications Inc
Freedom of Press 264.

Dantz Development
Retrospect 152.

DataViz
MacLink Plus PC 4.0 124.
MacLink Translators 98.

Dayna Communications
DOS Mounter 54.

Deneba Software
BigThesaurus 63.
Canvas 2.1 188.
Coach Professional 119.
Comment 2.0 58.
UltraPaint 124.

Digital, etc.
Business Sense 1.2 268.

Digital Vision
Computer Eyes CALL

Digitalk
SmallTalk/VMAC 125.

Dubl-Click Software
Calculator Const. Set 45.

Dubl-Click, WetPaint
1 & 2 Classic Clip Art 39.
3 & 4 For Publishing 39.
5 & 6 Animal Kingdom 39.
7 & 8 Special Occasions 39.
9 & 10 Printer's Helper 39.
11 & 12 Industrial Rev. 39.
13 & 14 Old Earth Alm. 39.
15 & 16 Island Life 39.
17 & 18 All The People 39.
World Class Fonts
Vol 1 & 2 (Originals) 39.
Vol 3 & 4 (The Stylish) 39.
Vol 5 & 6 (Giants) 39.
Vol 7 & 8 (Triples) 39.
World Class LaserType
Vol 1 - 9 each 39.

Electronic Arts
Disk Tools Plus 31.
Studio/1 96.
Studio/8 298.
Thunder II 49.

Emerald City Software
Smart Art 1, 2 & 3 each 84.
Type Align 62.

Farallon
PhoneNet Check Net 64.
Screen Recorder 125.
Traffic Watch 128.

Timbuktu 3.0
Single User 95.
30 User Pack 1,294.
Timbuktu Remote 128.
...w/9600 V.32 Modem 895.

Farallon/Electronic Arts
MacRecorder 2.0/Studio 1
Bundle 210.

Fifth Generation
Disk Lock 108.
Fast Back II 107.
PowerStation 2.5 34.
Pyro! 3.3 14.
Suitcase II 44.



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A Mac without room enough to think is a sad Mac. Put a happy face on your Mac; slip some SIMMs inside!

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Comic Strip Factory 38.
#1 Office Days 21.

Fox Software
FoxBASE+ 2.0 294.
FoxBASE+ Multi User 388.
FoxBASE+ Runtime 179.

FreeSoft
Red Ryder Host 2.0 99.
White Knight 11 85.

Generic Software
Generic CADD Level 1 84.

Hayes
Smartcom II 3.1 85.

Help Software
Desktop Help for Excel 49.

High Performance Systems
STELLA 2.1 385.
STELLA Stack1.0 275.

HJC Software
Virex 2.2 54.

ICOM Simulations
HyperTMON 58.
On Cue 1.3 35.
TMON 2.8.2 89.

Individual Software
101 Macros for Excel 36.
101 Scripts & Buttons 36.

Informix
Wingz 1.1 249.

Infosphere
Liaison 175.

Innovative Data Design
Dreams 325.
MacDraft 1.2b 178.

Insight Development
MacPrint 1.2 94.

Insignia Solutions
Soft PC 245.
Soft PC Portable 245.

Intuit
Quicken 1.5 36.

Jam Software - Smart Alarms
Single User Version 48.
1-4 Users 99.
5-8 Users 145.
9-15 Users 195.
16-25 Users 295.

Kent Marsh
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MacSafe II CALL
Night Watch 87.
QuickLock 56.

Kiwi Software
KiwiEnvelopes! 35.

Layered
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Insight Expert Series
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Eddy Award winning CAD package. Design and drawing software that thinks. Requires 68020 or 68030 and 4mb RAM.

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Letraset
ColorStudio 1,588.
DesignStudio 628.
FontStudio 468.
ImageStudio 274.
LetraStudio 274.
ReadySetGo! 4.5 274.

Lexpertise U.S.A. Inc.
Mac Proof 3.2.1 114.

Loop Software
Picture Book 39.

Lundeen & Associates
Works Plus Command 84.
Works Plus Spell 56.

MacFontware
Bitstream Fonts CALL

Mac Master
FEdit + ... 28.

MacroMind
MacroMind Accelerator 129.

The Mac Zone

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- Defective software replaced immediately. Hardware replaced or repaired at our discretion.
- Mac Zone has a 30 day money-back guarantee on hardware (USA Only).
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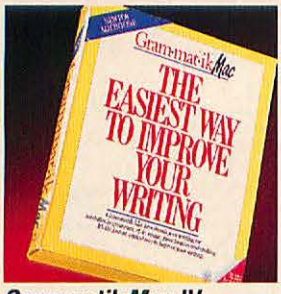
DesignStudio $628.



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Mainstay

Schedule development software, now in color! Helps you create clear, graphic schedules... fast! Schedules that took hours to draw now take only a few minutes. Draw flowcharts up to ten times faster than with drawing programs or pen and pencil. Graphically organize even complex programs, projects and structures, fast!

MacSchedule $149. MacFlow $125.

MBG
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Eddy Award winning graphics program. The drawing program for professionals in business, design, graphics and engineering.

Somak
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Disk Fit 1.5 58.
Network Disk Fit 225.
PixelPaint 2.0 224.
PixelPaint Pro 389.
Sentinel 2.0 86.
SuperSpool 5.0 58.
SuperLaserSpool 2.0
Single User 85.
Multi User (1 to 5) 289.

Survivor Software
Invoice It 49.
MacMoney 3.5 59.

Symantec
Just Enough Pascal 49.
Lightspeed Pascal 2.0 99.
More II 249.
S.A.M. 1.5 62.
S.U.M. II 94.
Think C 4.0 165.

Symmetry
Acta Advantage 64.
HyperDA 1.2 48.
Key Plan 245.
Picture Base 1.2 54.

Synergy Software
KaleidaGraph 2.0 145.
Versa Term 4.0 88.
Versa Term Pro 3.0 174.

Synex
MacEnvelope 78.
MacEnvelope Plus 179.

T/Maker
WriteNow 2.0 118.



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Tactic Software
ArtClip 1st Ed 50.
ArtClip 2nd Ed 64.
ArtFonts 1, 2 & 3 ea. 54.
ArtFonts Pak 129.
FontShare 148.
Icon-It 39.
Sound Clips 1 & 2 ea. 48.

TGS Systems
Prograph 129.

TimeSlips Corporation
TimeSlips III 168.

Timeworks
Publish It! 224.

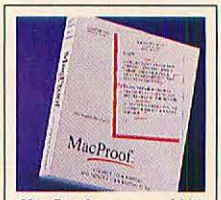
TML Systems
TML Pascal II 3.0 56.
...w/MPW 3.0 108.
TML Source Code Library ... 39.

TOPS
DOS Administrator 215.
Mac Administrator 215.
InBox 3.0/ + Macintosh 628.
TOPS (DOS Version) CALL
TOPS Network Bundle (Mac Version) 188.
TOPS NetPrint 2.0 117.

Totem Graphics
Color Clip Art by Subject
Birds 98.
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Food 98.
Holidays 98.
Insects 98.
Nautical 98.
Sports 98.
Tools & Hardware 98.
Wild Animals 98.
Women 98.
Color Clip Art by Volume
1 - 12 each 74.

Traveling Software
Lap-Link Mac Release III Connectivity Pack 119.
Lap-Link Mac Release III Network Pack CALL

Trendware
XCAL 77.



Mac Proof $114.

Lexpertise

Proofreading, text editing & revision software gives feedback on mechanics, usage, style, & structure to help improve your writing.

True BASIC, Inc.
True BASIC Language 2.02 . 56.
True BASIC Toolkits
3-D Graphics 46.
Business Graphics 46.
Scientific Graphics 46.
Developer's 46.
Mathematician's 46.
Sorting & Searching 46.
Advanced String 46.
Communications Support ... 46.
FORTRAN Convertor 46.

U.S. Micro Labs
FontSizer II 78.

VersaCad
VersaCad Drafter 424.

Visionary Software
Synchronicity 38.

Williams & Macias
myDiskLabeler
...for ImageWriter 28.
...for LaserWriter 33.
Labels, 216 (ImageWriter) .. 15.
Labels, 216 (LaserWriter) 18.
Sticky Business 89.

WordPerfect Corp.
WordPerfect 1.0.3 228.

Working Software
QuickLetter 73.

Xerox (Datacopy)
AccuText 545.

Zedcor Inc
DeskPaint/DeskDraw 64.
ZBasic 5.0 88.

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Abaton Scanners
300/GS (8 Bit) 1,495.
300/S (4 Bit) 1,198.

Complete PC
Half Page Scanner/400
Page Scanner

Logitech
Scan Man 319.

RasterOps
TrueCapture 324 1,995.
...w/ColorBoard 264 2,395.
w/Comp. Video Option ... 2,398.

Sharp Color Scanners
JX 300 3995.
JX 450 5995.

Thunderware
Lightning Scan 368.
ThunderScan 5.0 186.

Modems

Everex
EMAC MD2400 MNP 5 224.

Hayes
Smartmodem 2400 428.

MacTech - SmartLink Modem
2400m (MNP 5) 245.
2400s 139.

Prometheus
9600m Plus V.32 768.

Shiva Corporation
NetModem V2400 439.

Supra Corp.
Supra Modem 2400 129.

Telebit
T-1000 (9600 BPS) 699.
T-2000 (19,000 BPS) 1,254.
T-2500 V.32 (19,000) 1,254.

U.S. Robotics
2400 Baud 325.
9600 HST Baud 685.

Monitors & Cards

Micron Color Cards
for SE/30, II, IIx, IIcx, & IIci
Xceed (8 Bit - 13") 385.
Xceed (8 Bit - 19") 598.

RasterOps
ClearVue/SE 19" Monitor w/ 16MHz Board 1,595.
Trinitron 19" Monitor 3,398.
ColorBoards
108+ (II, IIx, IIcx, IIci) 899.
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224 (32 Bit - 19") 3,151.
264 (II series - 13") CALL
264 (SE/30 - 13") CALL

Sony - Color Multiscan
14" 1304 HG Color 795.
16" HG Color 2,498.
19" HG Color 3,198.



ColorBoards ... see listings

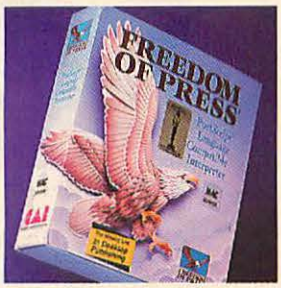
RasterOps

Best selling 8 and 24 color display systems adjusts to color monitors from 13" up to 19" with resolutions from 640 x 480 to 1024 x 768.

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MacSnap Upgrades
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524e (512kE to 1 Mb) 185.
524s (524e w/SCSI) 238.
548 (512k to 2 Mb) 432.
548e (512kE to 2 Mb) 418.
548s (548e w/SCSI) 478.
SCSI Port Adapter 109.
Marathon 020 SE Accelerators
MSE1 (Board Only) 428.
MSE2 (...w/1 Mb) 698.
MSE3 (...w/68881) 588.
MSE4 (...w/68881 & 1Mb) ... 898.
Marathon 030 Accelerators
Mac II series or SE/30 .. ea. 965.
Marathon Racer 148.

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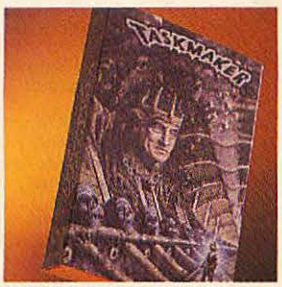
Beagle Bros., Inc.
Fastest, friendliest way to transfer files over AppleTalk. Transfers are done the Mac way - with folders. To send files to Joe, drop them in a folder named "To Joe" and they'll be sent in the background while you work, even across network zones. One set will serve an unlimited number of users per zone.

FLASH CALL



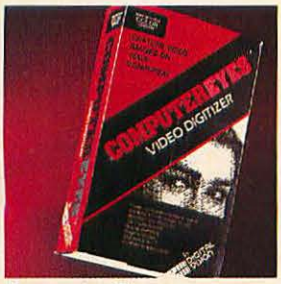
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User configurable keyboard. Modular design allows user to arrange the Alpha, Cursor, and Numeric keypads into many different positions. Other devices, (trackball, vertical function keys, digitizer tablet, programmable macro keys, etc.) may be substituted or otherwise added to the keyboard as well.

Switchboard CALL



XOR Corporation
The world has plunged into depression and devastation...the once mighty Kingdom is no longer. You must restore order and prosperity to the Kingdom, but you have no experience. To gain help, find the TaskMaker, and with his guidance and your courage, the Kingdom might be saved!

TaskMaker $27.



Digital Vision
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Computer Eyes CALL



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Mac Plus, SE, & II CALL

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Motorola
Math Co-Processors
68882 - 16MHz 289.
68882 - 25MHz 399.
68882 - 33MHz 695.
68882 - 40MHz 748.

National Semiconductor
Maccelerate A/Ux 469.

Orchid Technology
Mac Sprint II 249.

Total Systems
Gemini 020\030 Accelerators
68020 SE - 16MHz 697.
68020 SE - 25MHz 1,118.
68030 SE - 16MHz 976.
68030 SE - 20MHz 1,118.
68030 SE - 25MHz 1,285.
GemKit (allows user to put Gemini 020/030 Accelerators in Mac+, 512kE, 512k, & 128k. Includes internal fan, SCSI port, and space for extra RAM memory) 149.



atOnce! $284.

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Eddy Award winning small business accounting system with General Ledger, Payroll, Accounts Receivable and Payable.

Hard Disks & Backups

Dolphin Hard Disks
Integra 20 428.
Integra 30 478.
Integra 40 548.
Integra 60 614.
Integra 80 694.

Everex - EMAC Drives
60/60dtl Deluxe 1,495.
60t (Tape Backup) 658.
Impact Tape (150 Mb) 985.
Impact 40 Plus 735.
Impact 80 1,095.

PLI (Peripheral Land, Inc.)
Infinity 40 Turbo 998.
Infinity 40/40 Turbo 1,798.
Infinity Optical 600 Mb ... 3,998.
TurboFloppy 1.4 358.

Networking Hardware

Adaptec
Nodem E/Thinknet 383.
Nodem T/Twisted Pair 454.

Cayman Systems
Gator Box 2,159.
Gator Mail Gateway 698.
Gator Mail to Unix 698.
Gator Share Software 1,398.
Gator Card (Mac SE, II, IIx, IIcx, IIci, or SE/30) ea. 460.

David Systems
Twisted Pair Ethernet
Easy to install. Please call for information and current prices.

Dove
FastNet Equipment
Fastnet AE 1,249.
FastNet SE or SE/30 374.
FastNet III 374.
FI-1 Ethernet LAN/68020 Accelerator SE 995.
SCSI CheaperNet 748.
SCSI Thickwire Ethernet 849.

Farallon - PhoneNet
DB-9 32.
DIN-8 32.
DIN-8 (10 Pack) 214.
Star Connector 19.
Star Connector (10 Pack) .. 198.
Star Controller 825.
Star Controller EN CALL
Repeater 318.

Hayes
InterBridge 648.



Virtual see listings

Connectix
Eddy Award winner expands Mac's memory to the limit allowed by the operating system. Requires hard disk & 68020 or 68030.

Kinetics
EtherPort 469.
EtherPort Lattis Net 498.
Fast Path 1,945.

MacTech
ZoneNet - DB-9 or DIN-8 17.

Nuvotech
NuvoLink SC 345.
Turbo Bridge 318.
Turbo Net - DB-9 22.
Turbo Net - DIN-8 21.
Turbo Net ST - DB-9 30.
Turbo Net ST - DIN-8 30.

Shiva Corporation
EtherGate 1,831.
NetBridge 339.
NetSerial 279.
TeleBridge 339.

TOPS
Flash Card (TOPS Dos) 158.
TOPS FlashBox 122.
TOPS Repeater 128.

Miscellaneous

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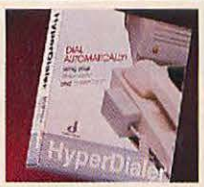
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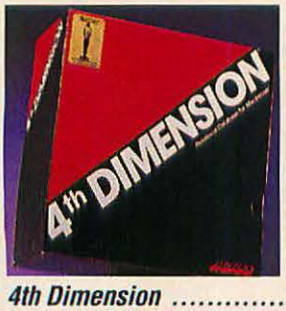
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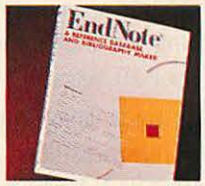
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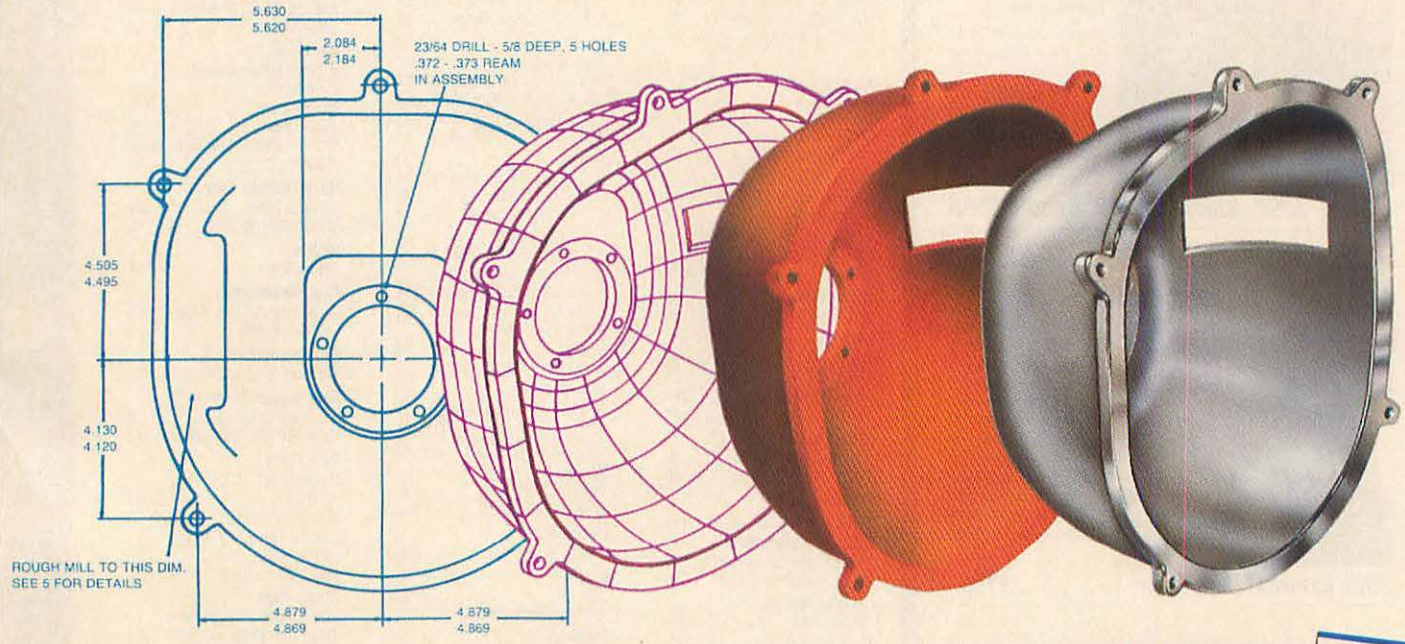
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Insights on Microsoft Works 2.0

FIREWORKS: SPEED TIPS AND ENHANCEMENTS FOR THIS POPULAR ALL-IN-ONE PACKAGE

BY CHARLES SEITER

Month after month, year after year, Microsoft Works appears in the top three of the best-seller list at the back of *Macworld.* By most accounts, it is the most popular program for individuals (as opposed to offices) yet produced for the Macintosh. Version 2.0 brought a new set of interactive drawing tools, a macro facility, and some improvements in the user interface and in tool-to-tool linking. Here are some tips from Microsoft and elsewhere for convenience and speed.

Art Class

Objectivity Drawn objects have a tendency to jiggle upon selection if the mouse is moving at all during the selection process. This makes it difficult to align the parts of a complex figure that consists of numerous small pieces. To pick out a single object from a collection, hold down the Shift key and draw a selection box around the object. That way, you won't get the object attached to the mouse at the point where you click. If your selection box accidentally includes another object, hold down the Shift key again and click on the unwanted object to deselect it.

If you want to draw a new object over a background or grid (this happens routinely in designing fancy letterhead), you can freeze an existing object by holding down the letter *F* and clicking on the object (you can freeze a collection of objects by selecting them with a selection box, holding down the letter *F,* and then clicking on one of the objects in the selection).

Curves and Straightaways An arc, as drawn with the Arc tool, always gives you 90 degrees of an ellipse (the circle is just a special case of an ellipse). If you need another type of precision curve segment, extend or shrink the arc from zero degrees to 360 by grabbing and dragging one of the handles at the end of the arc after you have drawn it.



ERIK ADIGARD

Rather than trying to erase a line in the middle of a complicated pattern, you can select the line and choose a transparent fill from the Fill Pattern menu. Another way to do the same thing is to choose the transparent line in the Tools palette.

Macro Scope

The Macro menu item in Works 2.0 makes it possible for Works to catch up to its more sophisticated relatives from Microsoft. For example, Works doesn't have a Glossary function, a nice feature of Microsoft Word. But if you have modest requirements, you can emulate a glossary by assigning a macro to a set of keystrokes and invoking them from the keyboard with a single-letter macro command. But you're limited in the number of letters you can use (and consequently, in the number of macros you can create) because certain letters are reserved for Works commands. For example, if you want to generate a closing for letters, simply select Macros On, select Start Recording, name the macro Closing, and tag it with a letter like *y.* Type in **Yours truly,** then press Return four times, then type your name (see "Signing Off"). Then stop recording. Any time you want to invoke the expression, simply press Option-y (or whatever letter you've chosen). The Option trick works for any macro and is faster than selecting the macro from the dialog box that appears for the Playback And command. For most efficient use of macros as a glossary replacement, make sure the Record Pauses check box is not checked; otherwise, the macro plays back the keystrokes at your own typing rate, presumably slower than the Mac's.

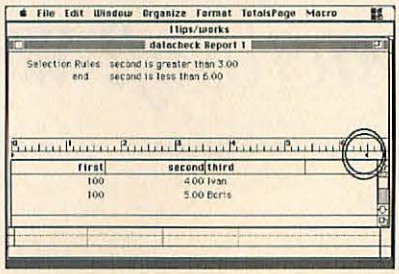
You may also want to start recording a macro as you start Works itself (this can automate a variety of procedures, such as spreadsheet calculations or database searches). To do this, pick Cancel at the Open dialog box, select Start Recording from the Macros menu, and begin recording the macro.

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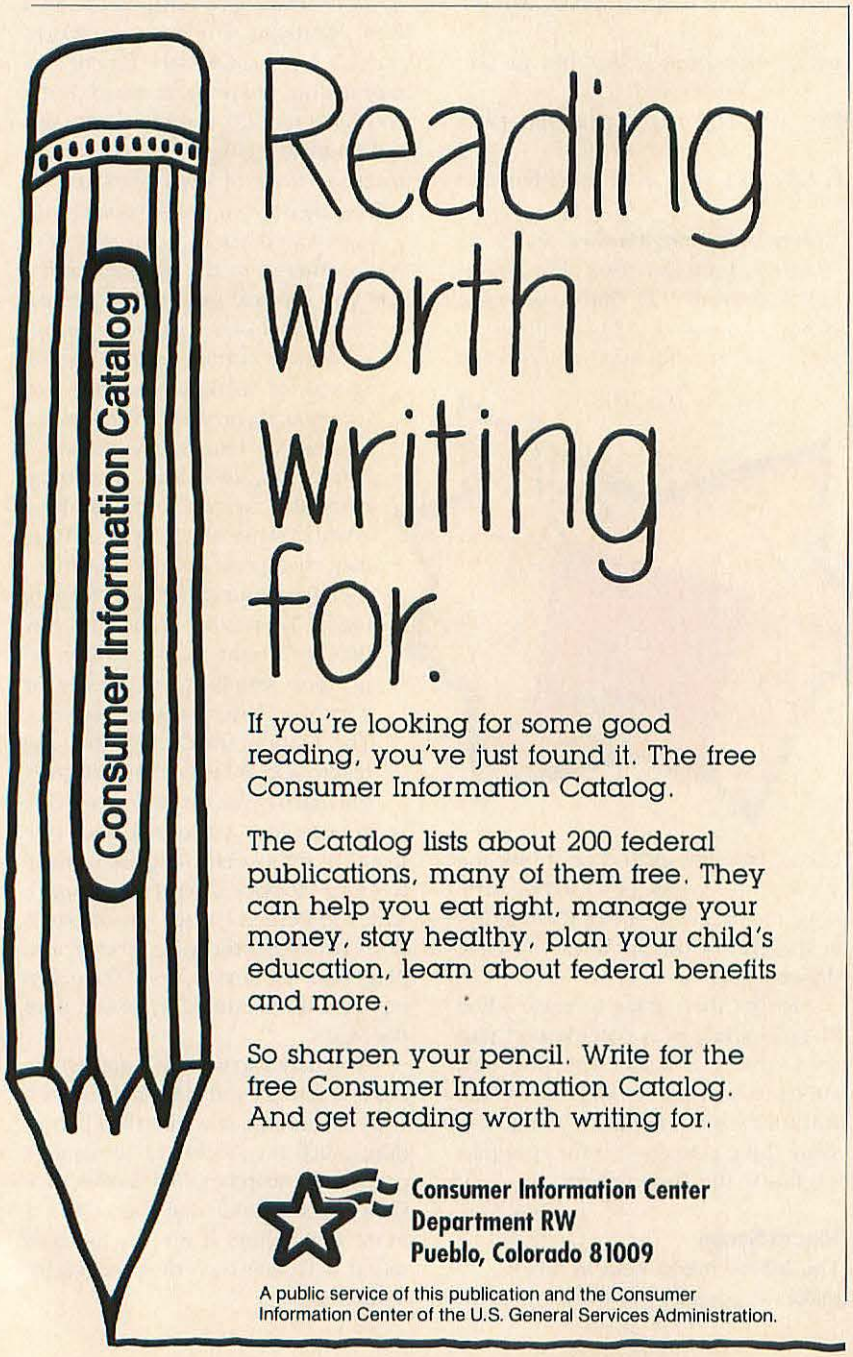
Signing Off

You can store stock closings to various letters as macros. Upon choosing Stop Recording, the dialog gives you the option of recording more keystrokes on the same macro (a title for Mr. Doe, perhaps).



Wide Reports

If you want to move the right margin in the Reports ruler (shown here in a bull's-eye) to make wider reports, first change the values in the Page Setup dialog box.



Printing Reports

You may find that in printing reports from a Works database you want to use the whole page—for example, if you're generating a high-density telephone directory or paper copy of a mailing list. Try though you might, you can't budge the right-hand margin past 7½ inches on the paper, which leaves an unwanted 1-inch margin on each side of the printout. The reason is that Works has consulted Page Setup (under the File menu) and passed the information on to the Report function. To move the margins, first go to the Page Setup dialog box and set the right and left margins to zero. This lets you set the right-hand margin on the Reports ruler to give you the full paper width when you need it (see "Wide Reports").

Click Tricks

Here are some speed hints for frequent operations.

Word Processor

- *Tabs* To set tab stops, just click in the blank area below the markings on the ruler. Click once for a left tab stop, twice for a right tab stop, three times for a decimal tab stop, or four times for a center tab stop. If you accidentally put in too many clicks, just keep on clicking—the selection cycles through these four choices.
- *Spelling* The spelling checker calls up a list of replacement words from its own dictionary when it finds a doubtful spelling. If one of these alternatives turns out to be the correct spelling of the flagged word, be sure to select it from the list rather than type it in the Replace With box. When you start typing, the checker grinds into action again, checking the word you enter against all the dictionary entries. Therefore, picking the word from the list is remarkably faster.
- *Word Count* Here's a quick and easy way to get a word count of a document you're working on. Since the spelling checker counts the number of words in the document before it starts looking for incorrectly spelled words to flag, put a nonsense word like *zzxf* at the top of the document. Then pick Correct Spelling from the Spell menu and select Cancel when it

(continues)

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stops at your nonsense flag. The resulting dialog box gives you a word count for the whole document.

Spreadsheet

▪ *Cell Attributes* Instead of crawling through the menus to find the Set Cell Attributes dialog box, just double-click on a cell instead. To Works, this means you are opening the cell for formatting, and the Set Cell Attributes dialog will appear.

▪ *Style* The keystroke combinations for rapid cell-text formatting are ⌘-B for bold text, ⌘-U for underlined text, and ⌘-N to revert to normal.

Database

▪ *Formatting* Double-clicking in a cell in either the form view or the list view brings up the Set Field Attributes dialog box. Since the database is really just a special case of the spreadsheet, you might expect many spreadsheet tricks to work here as well. Unfortunately, the ⌘-key combinations for rapid text formatting don't work in databases, even in list view.

▪ *Form-to-List Switch* You can easily switch back and forth between the form view and the list view in a Works database. In form view, just double-click in the white space anywhere on a form; in list view double-click in the record-selector box (see "Quick Switch").

Getting It Together

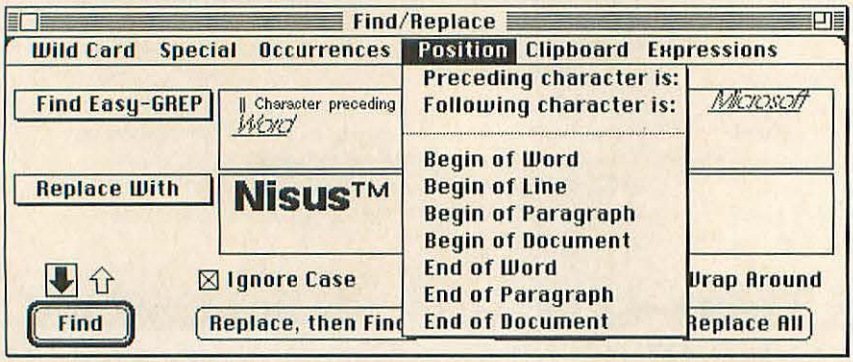
Works' undeniable strength is the tight integration of its applications—it's a miniature example of the interprocess communications promised in System 7.0, and it's already in place. There are a few points you may wish to follow for most effective use of the integrated package.

Because you can cut and paste rapidly between applications, you may find that you inadvertently run into memory problems when you've left a large selection in the Clipboard. Every time you transfer a large chunk between applications (for example, downloading a communications session into the word processor), free up Clipboard space by selecting and copying a small piece of information such as a single word. This effectively resets the Clipboard so that it takes up minimal space.

The Clipboard also comes into play when you have to transfer graphics in and out of Works. Because there is no provision for importing picture files created in other applications, the only way to bring pictures into a Works document (other than drawing them yourself with the Draw tools) is by using standard Macintosh methods in the Clipboard or Scrapbook. And since you can't directly export a Works text-plus-pictures document either, the same procedure also applies: you must select and copy the document, screen by screen, into the Scrapbook.

Another aspect of integration concerns printed communication with the outside world. When you are creating new mailing labels, you will need to check the amount of vertical space available. You do this simply by pressing Return until you see a page break. Once you have checked the amount of space, be sure to remove the page break (by deleting the extra returns) before printing. If you don't, Works

(continues)



Nisus 2.1's Find/Replace Command

Nisus 2.1 lets you search for any font, size, style, position and lets you qualify the search by asking if the item begins or follows a word, line, paragraph, or document.

"Best Wordprocessor"—MacUser UK 1989

The Nisus™ Find/Replace command can search on font, type, style, or position—

—and do it in any combination. It can even find every occurrence of a word in a document and index it

Nisus 2.1, which now reads and writes Microsoft® Word files, has a Find/Replace command that is only one example of the many differences between Nisus and Microsoft Word.

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The most powerful database programs have a built-in language, so why shouldn't a word processor? That's why Nisus has an integrated word processing language that will let you extend the power of Nisus to solve your specific needs. For example, one user created a function that automatically indexed all proper names in a document.

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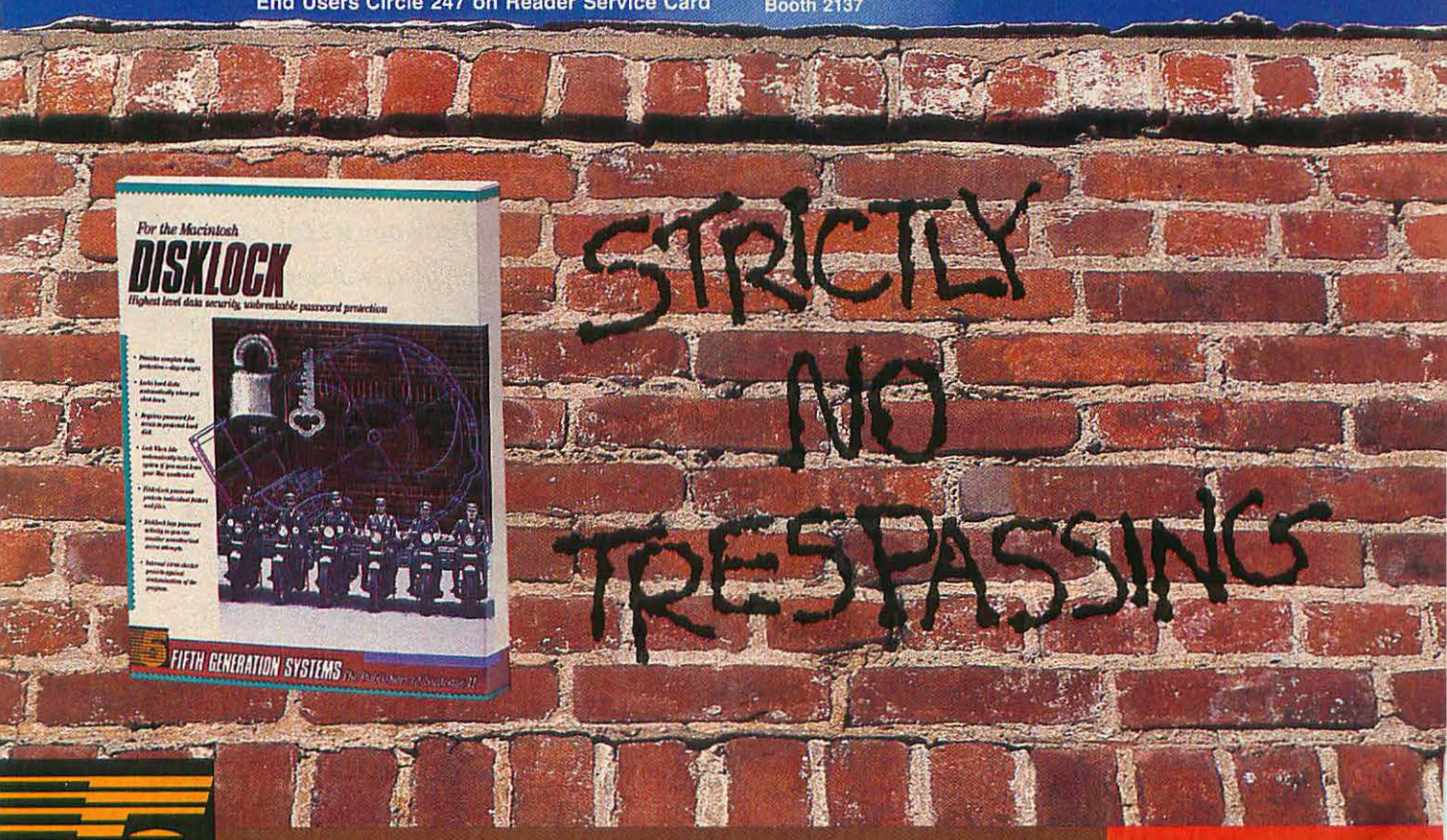
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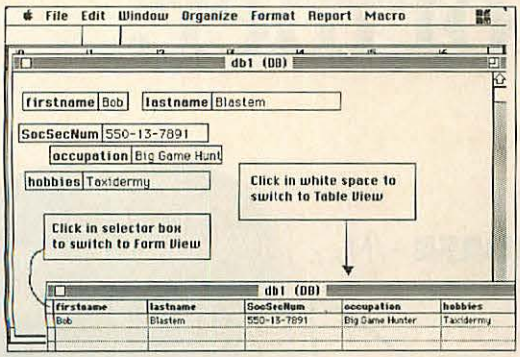
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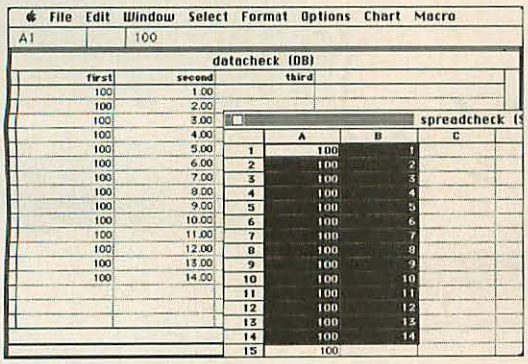
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Quick Switch

You can rapidly switch back and forth between form view and list view in a Works database by double-clicking in the right area. The right area in form view is white space in the form; in list view, it's the small selector-box column.



Fill Down

If you need to fill in a column of repetitive numbers (dates, for example) in part of a database, you can switch to the Works spreadsheet, use the spreadsheet's Fill Down command to create the data in columns, and then Copy the data to the database

will see it and faithfully skip every other label when it prints the set.

Yet another printing job is delivering information onto preprinted forms. Your best bet is to get the information into a word processing document (where you have somewhat better formatting control) and check 6 lines per inch from the Format menu. Six lines per inch is the magic spacing that makes the alignment work out on most preprinted forms.

Random Notes

To round out the collection, here are a few maneuvers that Works practitioners find useful.

Spelling Since it's not in the manual, most people don't know that the options in the spelling checker can be changed, while the checking process is under way. Just press ⌘-O and the Spelling Checker Options box appears, briefly interrupting the process.

Database Often you will want to perform the equivalent of a Fill Down command on a database field to put dummy data in the field or a sequence of repetitive numbers, such as dates. There's no Fill Down command in the database, but there is in the spreadsheet. You can select data from the database and copy it to cell A1 of a blank spreadsheet, perform the fill in the spreadsheet, and copy the data to the appropriate number of cells. Then copy this spreadsheet column into the List View of the database. "Fill Down" illustrates the process.

Start-up One of the most convenient features in Works is the Make Works Desktop command under the File menu. If you have a collection of application files that you use every day (phone contacts, budgets, form letters) simply open them all, pick Make Works Desktop, and name the desktop Startup in the desktop dialog box. Then double-click on the Startup desktop icon at the start of your Works session to get all your frequently used files in place at once.

Sharing the Wealth

If you've found a tip or shortcut not mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips, Macworld,* 501 Second St., San Francisco, CA 94107. Ⓜ

See *Where to Buy* for contact information.

Charles Seiter is a Macworld *contributing editor and beta tester of many Mac spreadsheet programs. His primary interest is in macro programming for scientific applications.*



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Automating Your Small Business

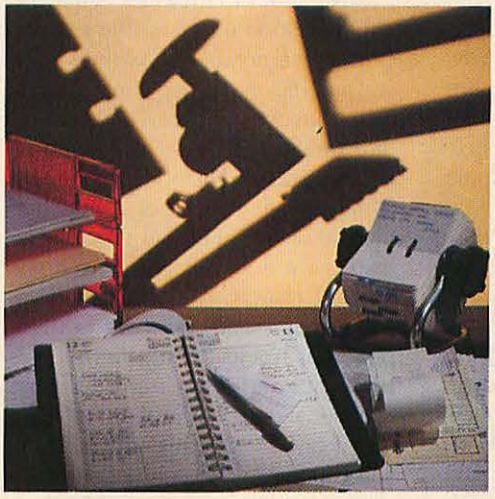
How to get up and running on the Mac

BY CYNTHIA W. HARRIMAN

The decision to automate can be paralyzing. There's so much you want to streamline—invoicing, tracking job costs, finding new customers—that it may feel as if just deciding where to start takes more time than you have. You're not alone.

Many small businesses continue to keep their receipts in a shoebox while they look for the perfect accounting system, or address thousands of letters by hand while they try to figure out how to mail-merge using Microsoft Word.

You're better off abandoning your search for the ultimate solution and starting small. Analyze your business. Look for one single job that you do over and over in the course of a day, and begin by finding a program to automate it. Or seek out a job you do less frequently but that's utterly tedious and repetitive, and automate that. Then, when your first solution is working, tackle another job. As you do so, make sure any program you choose meets the following criteria:



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- *Is it simple?* It's easy to be tempted by features you might need someday, to the detriment of those you must have now. Some programs include so many extra features you don't need that the ones you want are compromised.
- *Is it flexible?* Some programs are too simple: their few features are rigidly locked into operating in ways that don't fit your business. Find a program that changes to fit you, instead of one that insists that you change.
- *Is it quick?* If you're automating a frequent, repetitive task, you should use a desk accessory, or at the very least an application you can keep running under MultiFinder in available RAM. And it needs to do the job in the fewest keystrokes possible.
- *Is it easy?* Some solutions have great potential but such a steep learning curve that you can't find the time to figure them out. Better to choose something else that can do 80 percent of what you need—starting today.
- *Is it Mac-like?* The best automation solutions have a good Mac interface, so you can learn them easily, and observe standard Mac data formats, so you can readily move data in and out of them. Then, when a better solution comes along or your needs change, you and your data can move on.

In this article, I describe a few programs that meet these criteria and mention some near-misses that don't quite, to help you make the best choices for your business.

Kiwi Envelopes

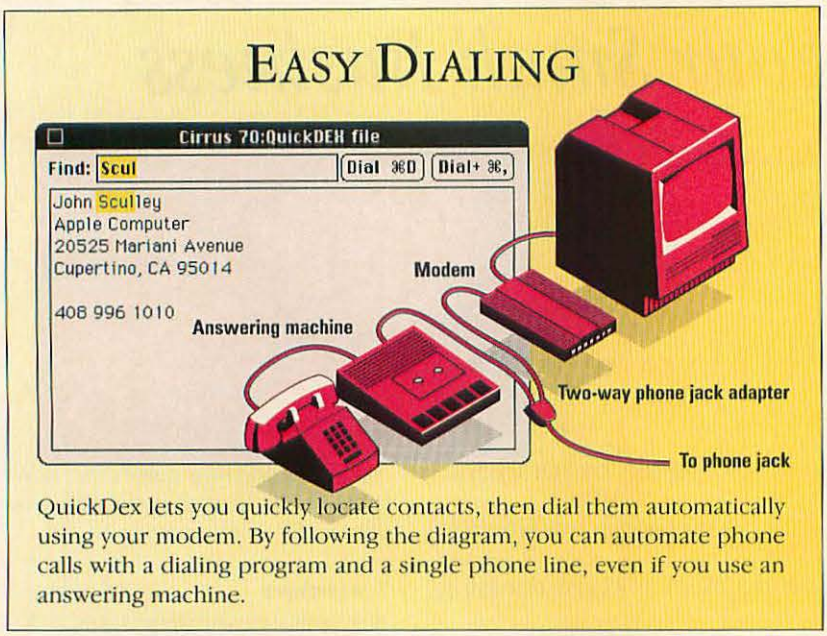
All businesses write letters, and all letters need envelopes. But for most businesses, envelopes have proven extremely resistant to automation. Kiwi Envelopes changes all that. It's a DA that not only prints envelopes automatically, but can also add a Post Office–approved bar code to speed letter sorting. Once you've written a letter, simply highlight the name and address in the heading of the letter and copy it to the Clipboard. Kiwi Envelopes takes the information and, as soon as you feed an envelope into your printer, turns out a perfectly addressed finished product.

It's a small matter and therefore a perfect illustration of sensible automation. Kiwi Envelopes is simple, offering just the features you need to do the single task of printing an envelope. It's quick, producing a finished envelope in three mouse movements, on an ImageWriter, a LaserWriter, or any of several third-party printers. And it has about a two-minute learning curve, since it works with predictable Mac conventions.

QuickDex

QuickDex is another candidate for the small-business Hall of Fame. It's the electronic equivalent of the traditional Rolodex-type file, with the ability to dial your phone thrown in for good

(continues)



QuickDex lets you quickly locate contacts, then dial them automatically using your modem. By following the diagram, you can automate phone calls with a dialing program and a single phone line, even if you use an answering machine.

measure (see "Easy Dialing"). The whole process of finding the right person and dialing the phone seems trivial. Yet it's a process most businesses perform so many times a day that automating it can really make a difference.

Let's say you're trying to call Apple CEO John Sculley. You open the QuickDex DA, and the first card in your file appears on screen, topped by a blank Find box. You type in **John** or **Scul** or **Apple**—any words or partial words contained anywhere on John Sculley's card—and then press Return.

If you've typed enough to uniquely identify an entry (**Scul** might be enough), the right card pops onto the screen. If not (**John** and **Apple** might appear several times in your file), QuickDex selects all the possibilities and shows them to you one by one as you press the Return key. Once the right card appears, you simply pick up your phone and press ⌘-D. If you have a modem attached to your phone, the modem automatically dials the first telephone number on the card.

Putting data into QuickDex is almost as easy as finding it again. There's no strict fill-in-the-blank structure; cards can include three phone numbers and a fax number or the names of a contact's spouse and kids—whatever's important to you. Flexibility, combined with speed and simplicity, makes QuickDex an ideal office-automation solution.

Just as Kiwi Envelopes is not the only envelope utility on the market, QuickDex is not the only address book and autodialer. (For more information on automated telephone and address directories, see "Roll Over Rolodex" in this issue.) Address Book Plus and DAtabase are two other good commercial dialers, and you probably already own a similar program in the form of HyperCard's linked address and phone stacks. But each of these programs has its drawbacks. Address Book Plus and DAtabase use a more traditional database structure of carefully defined fields, which many people find limiting. And HyperCard's address stack is neither quick nor flexible.

QuickDex isn't perfect. Its nonstandard data format makes exporting and importing data difficult, which bothers many people. But without it, you might sacrifice a lot of productivity waiting for the perfect autodialer.

Microsoft Works

While small utility programs work best for tasks that are repeated throughout the day, some jobs are more complex and require a full application.

One such job is form letters, a chore common to most small businesses. At their worst, you know these as junk mail—those obnoxious letters that start off, "Dear Stephen Foster, We're contacting residents of the Suwannee River area to tell them about our new product . . . " But form letters can be extremely useful in dozens of ways. You may want to send dunning notices to all your overdue accounts receivable, with the proper name and balance due in each. Or you may want to remind inactive clients that your business still exists.

I use Microsoft Works to automate mailings, even though Word is my word processor of choice. Why? Because I'm not comfortable with Word's mail-merge process. And this illustrates an important consideration in automating a business: it often makes sense to spend a little more money instead of a lot more time. Good Mac programs can be quickly learned and they let you move data easily, so there's no reason to insist that any one program meet all your needs.

Works includes both a database and a word processor, so it's easy to create a simple list of names and addresses with customized messages and insert them, one by one, into a letter. Let's say you want to send the customer-reminder letter mentioned earlier. You can start with an existing customer database in Works or create one using the Add Field command in Works' database module. You want to add fields for first name, last name, company, street, city, state, zip, and product. Next, you create a new blank word processing document. Finally, you use the Prepare to Merge command in Works' word processor to insert information from each database field into the appropriate spot in the letter. Once you're done, Works lets you see your letter with either the field names or with sample information from your first set of data (see "Mail Merge Simplified").

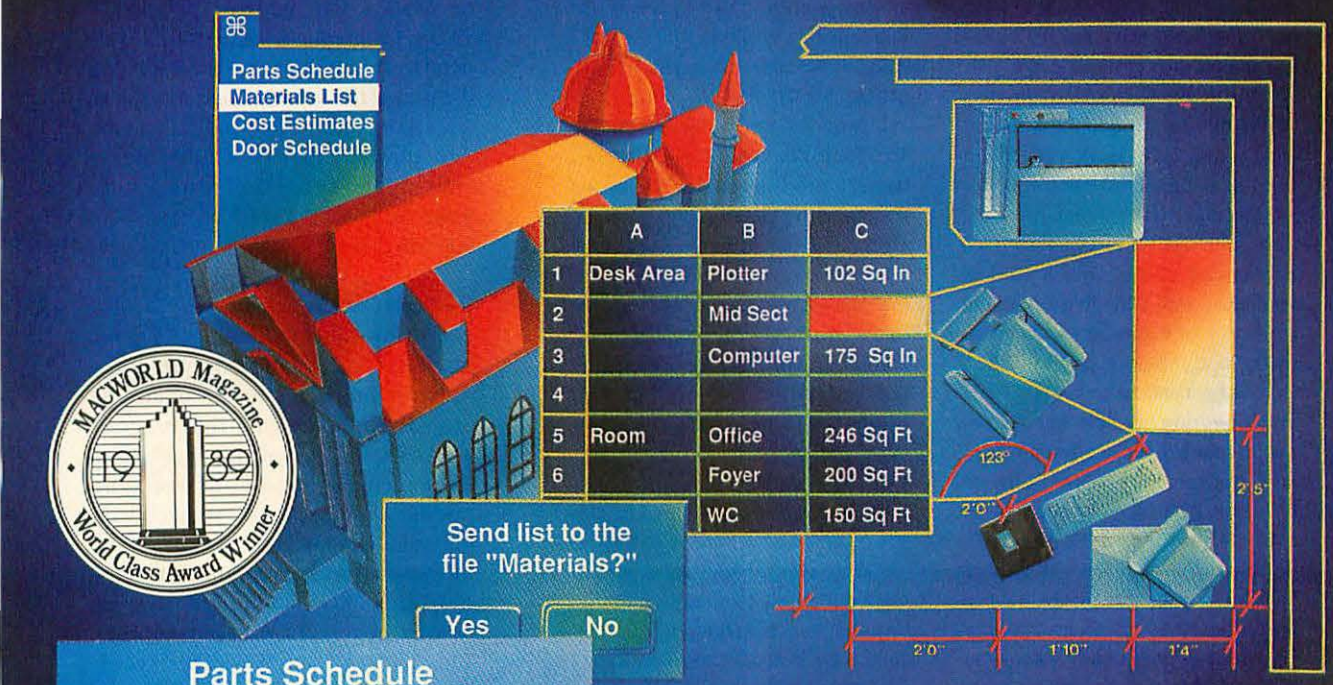
Works doesn't meet my spreadsheet and word processing needs. But I do use it for form letters and mailing labels because it meets the criteria of a good automated solution: it's simple, flexible, and easy.

The Bottom Line

For many people, keeping track of money is one of the main reasons for buying a computer. But automating finances can be one of the most difficult tasks any business faces. Moreover, most magazine articles on choos-

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142	1/8"Tile - Mosaic	56.95
2689	Brick - Chicago	12.00
63	Siding Alum (Sky Bl)	78.95
12	Paneling (Oak)	12.00
		05.00
	Wall Fixtures- Elec:	67.45
24	Wall Outlets	34.00
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	CTV Plug-In	55.00
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TEMPLATES EASE AUTOMATION

One easy way to automate a business is with *templates,* ready-made customizable documents that work with a particular application. Below are some templates that are geared to small businesses.

Small Business Accounting System ($79) and Schedule C Accounting System ($25) work with Microsoft Excel. Small Business Accounting can run a cash or accrual business with up to ten checking accounts and comes with a 16-page manual on disk. Schedule C Accounting posts all business expenses directly to a category on the IRS tax form Schedule C, simplifying tax time and covering all the accounting needs of a simple one-person business. Both are from Heizer Software, P.O. Box 232019, Pleasant Hill, CA 94523; 415/943-7667, 800/888-7667.

Small Business Retailer ($295) is an extensive set of templates for FileMaker designed to cover most typical retail business needs. The set includes templates for sales orders, employees, purchase orders, accounts receivable, accounts payable, inventory, customer lists, and more. Its 150-page manual helps you learn enough to customize the package for your specific business. Packer Software, 12 Roosevelt Ave., Mystic, CT 06355; 203/572-8955.

Growing Your Business Using Microsoft Works ($20 to registered users) is modeled around a fictitious country inn. These templates can be customized to help the average small business create a business plan, manage accounts receivable, analyze return on a potential investment, compute cash flow and financial ratios, and carry out a direct-mail campaign. The 86-page manual is especially well written and comprehensive. Microsoft Corporation, 16011 N.E. 36th Way, Redmond, WA 98073-9717; 206/882-8080 or 800/426-9400.

One word of advice: to get the most out of any template, you must be familiar with its underlying application. Be prepared to learn Excel, FileMaker, or Works before you use these templates.

ing an accounting package don't help: they're written in accounting jargon that leaves many people even more confused than before.

If you already understand accounting principles—or if your business is complex enough to demand that you learn—study the available accounting packages and get to work (see "A Full Accounting," *Macworld,* November 1989, for an overview). If you break out in a rash when you simply hear the word *accounting,* though, the best place to start automating your business books is at the beginning, by understanding the difference between bookkeeping and accounting.

Bookkeeping simply means keeping track of all your expenses and income. If you save all your receipts in a shoebox, you're keeping books. If you write all your expenses and income in a spiral notebook, you're keeping books. If you record all your checks and deposits in a checkbook, you're keeping books.

Accounting is the next step, where you use the numbers in your books to analyze where your business stands—to *account* for its success or failure. Accounting can encompass everything from a simple income (or profit and loss) statement to a balance sheet (which shows everything you own versus everything you owe) to corporate tax returns and beyond.

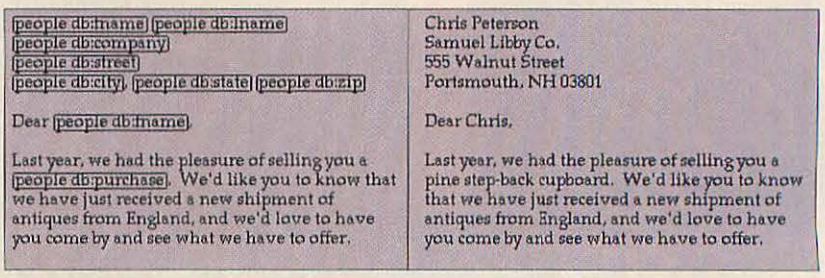
The typical small business needs plenty of bookkeeping and a smidgen of accounting—just enough to get a glimpse at the bottom line now and then. If you don't know a credit from a debit and your business is too small to hire someone who does, don't even look at accounting programs. Stick to bookkeeping ones instead, which are usually described as personal-finance or money-management programs. These programs will tell you all you need to know about your finances until the end of the month, quarter, or year, when you dump your printouts on the desk of your local CPA. One of the secrets to successful automating is to make sure you don't bite off more than you can chew.

The Single Checking Account

For many small businesses, a good place to start is Quicken, one of the simplest bookkeeping programs on the market. Basically, the program works like an automated checkbook. On screen you see a form that looks just like the checks you've been writing manually for years. Fill it in with the amount and payee, then fill in the stub with information about the expense category for your expenditure, and that's it (see "Basic Bookkeeping"). Once your check's filled in, Quicken can even print it on check paper available from the company.

Quicken harbors no illusions that you understand anything about accounting or that you care to learn. Its expense categories are made up of approachable words (like *office supplies* and *telephone*) instead of numbers, and the words *credit* and *debit* aren't even in the manual. But despite its simplicity, Quicken fulfills the needs of many small business users. It can take the information you've entered about your checks and deposits and generate a simple income statement

(continues)



Mail Merge Simplified

Form letters are easy to create with Microsoft Works. The program lets you see a form letter with the field names (left) or with sample information from your first set of data.



The Mac User's Set is yours for only $4.95 when you join the Small Computer Book Club

Please accept my application for trial membership and send me the Mac User's Set (00052) billing me only $4.95, plus shipping and handling. I agree to purchase at least three additional Selections or Alternates over the next 12 months. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three additional books. A shipping and handling charge is added to all shipments.

No-Risk Guarantee: If I am not satisfied—for any reason— I may return the Mac User's Set within 10 days. My membership will be canceled, and I will owe nothing.

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Address _____ Apt. _____

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(Books purchased for professional purposes may be a tax-deductible expense. Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)

Macworld 5/90 Y-CS6



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Name _____

Address _____ Apt. _____

City _____

State _____ Zip _____

(Books purchased for professional purposes may be a tax-deductible expense. Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)

Macworld 5/90 Y-CS6

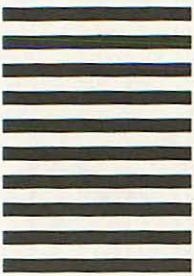
The Mac User's Set for only $4.95



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is yours for only $4.95



as your introduction to the Small Computer Book Club

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THE A/UX HANDBOOK
A Complete Guide to Apple's UNIX, Version 1.1
Jan Harrington

Use the power and flexibility of A/UX to improve business productivity. This invaluable resource helps you gain access to thousands of Mac applications, while serving as an essential tool for UNIX users and developers adopting the Mac A/UX platform. You'll discover how to organize a UNIX system, work with UNIX text files, write shell and C programs, and perform system maintenance. Includes a special index on working with C 393.
Publisher's Price $29.95

THE FULLY POWERED MAC
Everything You Need to Make Your Mac Faster, More Efficient, and Tailored to Your Needs.
—Includes an 800K disk—
Robert C. Eckhardt

Virtually every Macintosh upgrade or short-cut is covered in the nearly 600 pages of insightful tips and strategies. You'll find clear instructions for a wide variety of functions including putting your Mac on "automatic pilot", increasing its operating speed, managing excess file loads, and how to combat the speed and efficiency lags of copy protected disks. Plus the 800K disk has a ready-to-run library of 20 freeware/shareware programs.
Publisher's Price: $39.95

HANDS-ON EXCEL
Shortcuts, Strategies, and Techniques
Second Edition
Danny Goodman and Gordon McComb

Let Excel do your work for you. This valuable reference explores all important functions and macros using real business examples and applications. You'll learn the software's advanced spreadsheet, charting, and database capabilities. Covers strategies and timesavers such as how to manage multiple documents and overlapping windows, create a "safety net" so you can restore a window (even if you've accidentally closed it), design a database that automatically sorts your selections, and much more.
Publisher's Price: $22.95

THE SMALL COMPUTER BOOK CLUB provides the best books on small computing from a wide variety of publishers, and will keep you up-to-date with books on the latest software releases, programming tools, and much more, all offered to you conveniently and inexpensively.

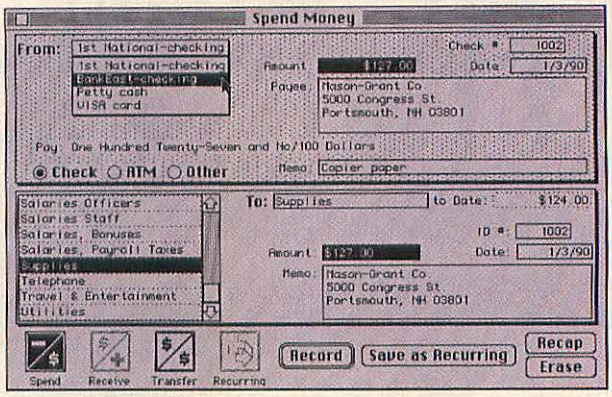
MEMBERSHIP BENEFITS• In addition to getting the Macintosh User's Set for only $4.95 when you join, you keep saving substantially on the books you buy. • Also, you will immediately become eligible to participate in our Bonus Book Plan, with savings of 60% off the publishers' prices. • At 3-4 week intervals (15 times per year), you will receive the Small Computer Book Club News, describing the coming Main Selection and Alternate Selections, together with a dated reply card. • In addition, up to two times a year, you may receive offers of Special Selections which will be made available to a group of select members. • If you want the Main Selection, do nothing, and it will be sent to you automatically. • If you prefer another selection, or no book at all, simply indicate your choice on the card and return it by the date specified. • You will have at least 10 days to decide. If, because of late mail delivery of the News, you should receive a book you do not want, we guarantee return postage.

If reply card is missing, please write to Small Computer Book Club, Dept. Y-CS6-00052, 900 Chester Avenue, Delran, NJ 08075, for membership information and an application.

that subtotals expenses and revenue, and totes up your net. You can even, with the aid of some excellent tips in the Quicken manual, use it to keep track of payroll and accounts receivable (the money people owe you) in an elementary but very useful way.

Quicken may be the program for you if you run your business primarily from a single checking account on a pay-as-you-go basis. But it's not equipped to handle frequent cash or credit transactions easily, and it's unable to give a true picture of any business that owes—or is owed—large sums of money.

Let's say that your business has just taken out a $50,000 loan. You deposit the money in your checking account along with all your other income, then three days later print out an income statement. With an extra $50,000 in the till, your bottom line looks very rosy. But in fact, the business is now in debt. If you want the whole picture, you need a statement showing how much you own (your assets) and how much you owe (your liabilities). That's a balance sheet, and it's beyond the capabilities of a simple bookkeeping program like Quicken.



Advanced Bookkeeping
Managing Your Money lets you track several accounts, but remains easy to use.

Multiple Accounts

Accounting is based on the idea that for every action there is an equal and opposite reaction: every time your expenses go up, for instance, your checkbook balance goes down. If your checkbook is on one end of every transaction—as it must be in a program like Quicken—you only need to record each entry once to account for the other end. But in many businesses, the facts are more complex. You buy a roll of stamps, and it changes both your postage expenses and your petty cash. You purchase a new hard disk, and that increases both the value of your office equipment and the balance due on your credit card.

To accurately reflect transactions like these, you need a program that can keep track of several accounts—checking accounts, credit card balances, and cash—as well as other assets like office equipment and other liabilities like bank loans. Most programs that can do this insist that you understand accounting. Andrew Tobias's Managing Your Money, from Meca, does not.

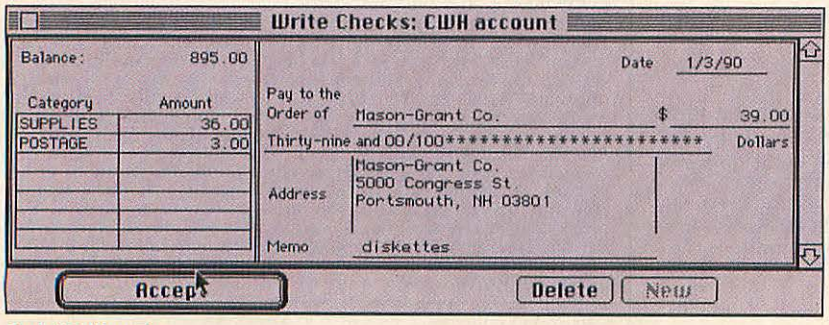
I moved to Managing Your Money (MYM) when I started using a business credit card for many of my business expenses. MYM now handles all my finances, with one set of books for my business and another for my household expenses. The program works much like Quicken, with an easy-to-understand checkbook metaphor. The main difference is a pop-up box in the corner of the check-entry screen that lets you switch among different cash, credit, and checking accounts (see "Advanced Bookkeeping"). Like Quicken, MYM can print checks and income statements. It can also print a balance sheet and graph budgeted expenses versus actual expenses. Despite this added flexibility, though, MYM does not require you to learn anything more about accounting than does Quicken.

Quicken and Managing Your Money are not the only simple finance programs on the market. MacMoney and Insight OneWrite, for instance, are also popular with small businesses. But both of these programs share Quicken's single-account limitation—without Quicken's simplicity. Unless you're running a retail business or a business with several employees, stick to programs like Quicken and Managing Your Money that are as simple as possible. Then, if your business outgrows them, you can change over to a more elaborate program at the new year, when most of your accounts start over at zero.

On Your Own

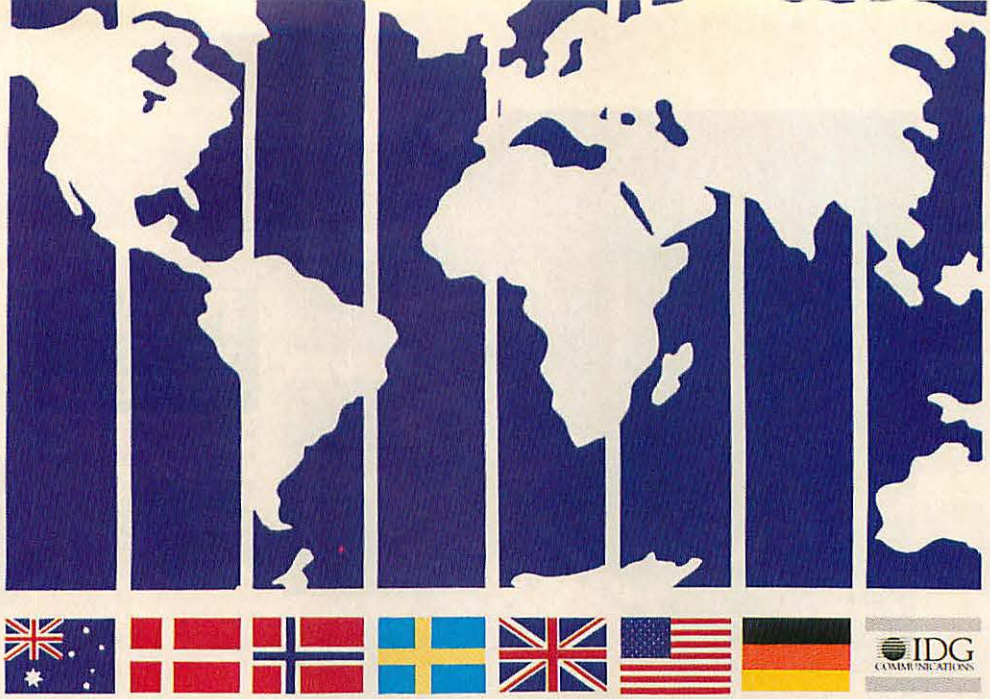
Automating phone calls, envelope printing, form letters, and bookkeeping are just a few of the many chores that the Mac can make easier. Don't put up with solutions that are more work than the original problem, but don't sit on your hands waiting for the ultimate solution, either. And as you chip away at your business challenges one by one, remember—the best solutions are simple, quick, and flexible. M

See *Where to Buy* for contact information.



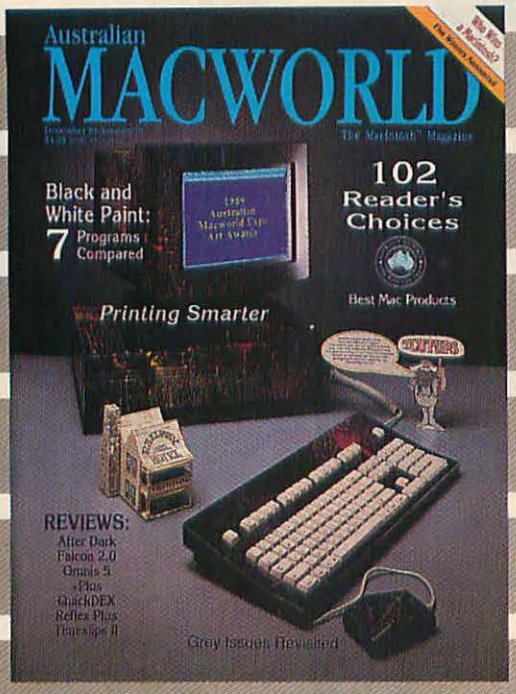
Basic Bookkeeping
No accounting knowledge is needed to use Quicken, which works like an automated checkbook.

Cynthia W. Harriman is the author of The Macintosh Small Business Companion *(Brady, 1989), a guide to automating small businesses with Macs.*



The Global Market.

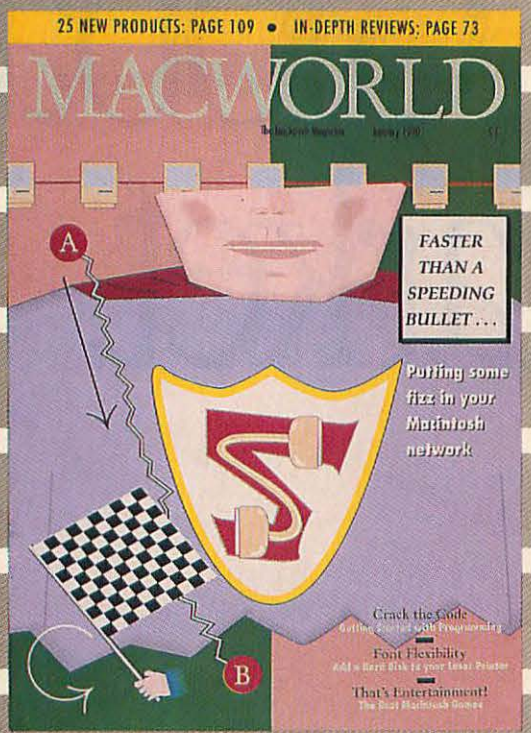
Just a network away.



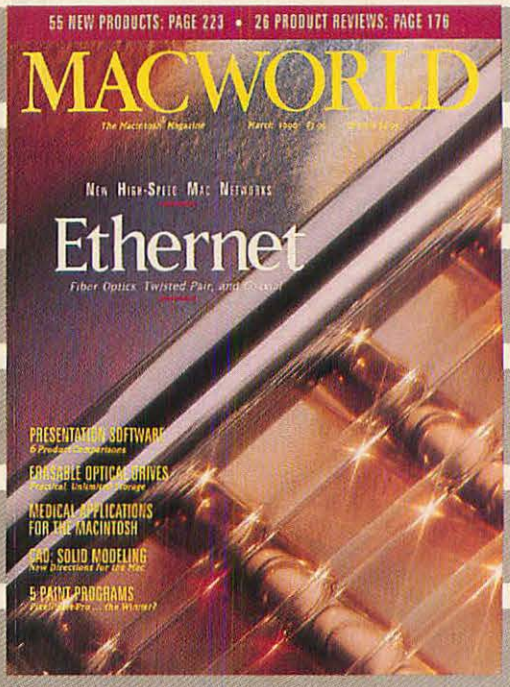
Macworld Australia



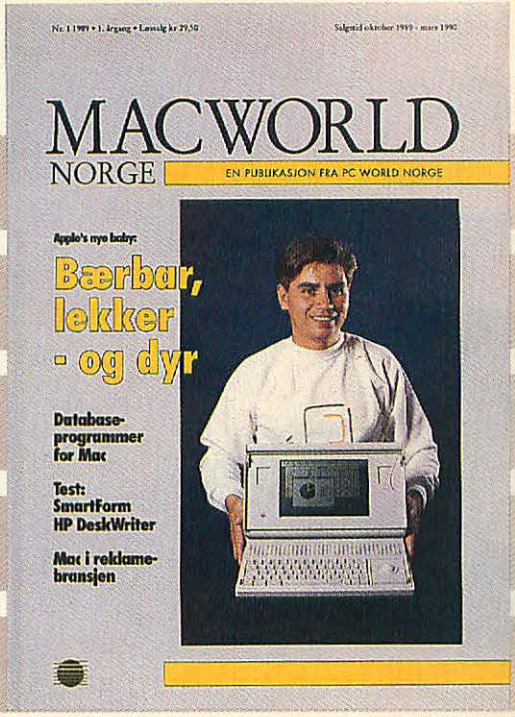
Macworld Denmark



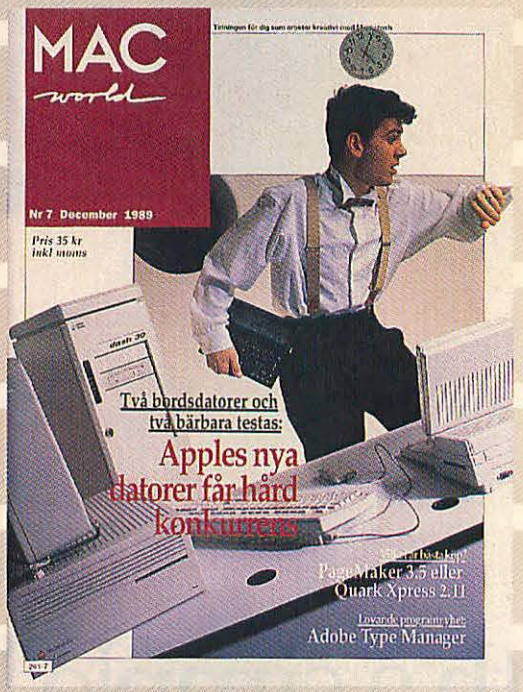
Macworld United Kingdom



Macworld USA



Macworld Norway



Macworld Sweden



Macworld Germany

The Macworld Global Network.

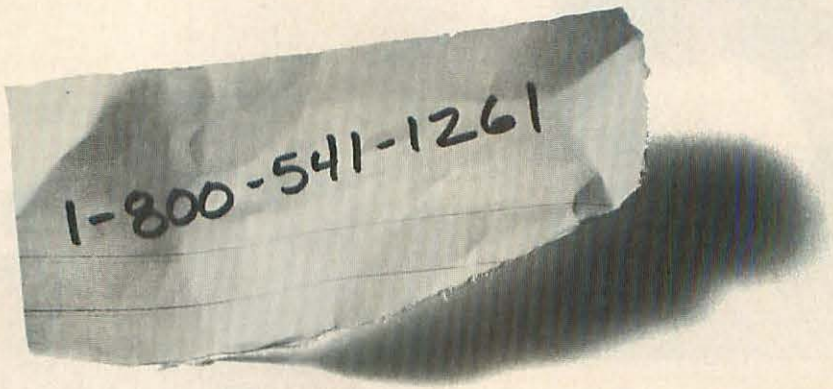
The Macintosh international market is thriving. Macintosh users around the world spent seven billion dollars on hardware and software in 1989, and they will *increase* that number by *one billion* in 1990. Companies who move swiftly to target and reach these buying prospects will get a head start on winning big in the 1990's. Macworld magazine provides the solution...the *Macworld Global Network.*

The Macworld Global Network - seven international publications with a total readership of over one million Macintosh users and buyers - reaches the most lucrative markets in the world. While spanning the globe, the Network is the best way to target and penetrate these profitable international markets. And we will continue to expand into the most powerful Macintosh markets worldwide.

Don't miss out on the enormous buying power of the Macworld Global Network. Call your Macworld USA sales representative to open a world of new opportunities.

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GLOBAL NETWORK



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UPDATES

Here's our list of the current shipping versions of Mac software at the time we went to press. We hope you'll find it useful. Because these days, keeping track of the latest CPU is tough enough.

After Dark version 1.1 includes three new patterns: Puzzle, which divides the screen into a grid and then scrambles the pieces; NightLines, which generates patterns; and Doodles, an automatic doodling module. Berkeley Systems, 415/540-5535. $5 upgrade; $39.95 new.

Icon-It version 2.0 adds vertical icon bars, a grid system for the display of row-by-column icons, and an online help system. Tactic Software, 305/378-4110. $29 upgrade; $79 new.

RagTime 3 does text processing in 14 languages, with spelling checkers and hyphenation dictionaries; includes spreadsheet and layout capabilities; can be used to produce business graphs; and is interactive with the spreadsheets from which data is extracted. Images may be scanned directly into RagTime 3. Ragtime, 415/780-1800. $150 upgrade; $599 new.

White Knight version 11 works with twelve different file transfer protocols and emulates TTY, VT52, VT100, and VT102 terminals. The FreeSoft Company, 412/846-2700. $35 upgrade; $139 new.

PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
1st Aid Kit ★	2.8	512KE/3.0		*
4th Dimension	2.0	1MB/6.02	3/90	*
Aatrix CheckWriter II ★	2.01	512K/4.1		$10
Aatrix TimeCard	2.0	512K/4.2		Free
Accountant Inc.	2.1	1MB/6.02		$9.50
ACCPAC Bedford Simply Accounting	1.1	1MB/5.1		$50
AccuText ★	1.1	4MB/6.02		*
AdWriter	2.0	1MB/6.0		Free
After Dark	1.1	512KE/3.2		$5
Alchemy	1.1	1MB/6.0		$25
Aldus FreeHand	2.0	1MB/6.03	6/89	*
Aldus PageMaker	2.02	1MB/4.1		*
Aldus Persuasion	2.0	1MB/6.0	6/89	*
AmPack Plus ★	4.2.2	512K/3.2	1/90	$29.95
Analog Connection WorkBench	3.0	1MB/5.0		$50
Anatool ★	3.1	512K/3.0	7/89	$35
AntiToxin	1.2	512KE/4.2	2/90	Free
APL.68000	7.0	512K/3.2		*
AppleShare File Server	2.0	512K/3.2		*
Archie	2.0	1MB/6.0		$75
ArchiText	2.0	1MB/6.02	7/89	Free
Aristotle's Politics	2.0	2MB/6.03		Free
The Art Importer	2.0	1MB/6.0	8/89	$20
ArtRoom	3.0	512K/3.2		$199
AutoCalc	2.0	1MB/6.0		$95
AutoSave II	1.1	512KE/4.2		$7.50
Aztec C	3.6	512KE/4.2		*
BackFax ★	1.02	1MB/6.03		Free
Back to Basics: Professional	2.0	512K/3.2		$75
Ball & Stick ★	2.2	1MB/6.0		Free
Bill-It	2.0	1MB/6.03		$29
Bridge	6.0	512K/3.2		$17
Business FileVision ★	1.5	1MB/6.02		*
Business Sense ★	1.2	1MB/6.0		*
Business Session ★	3.2	512K/3.2		Free
CA-Cricket Presents	2.0	1MB/6.0		Free
Calculator Construction Set ★	2.06	512K/3.2	4/90	$25
CanOpener	1.1	512K/3.0		Free
Canvas	2.1	1MB/6.0		*
Capture	2.0	1MB/6.0	2/90	$15
ChromaScan	1.1	4MB/6.02		Free
Client/Mac	2.0	1MB/6.0		$370
Colorset ★	1.2	1MB/6.0		Free
Colleague 2 ★	2.05	2MB/6.03		*
Comment	2.02	1MB/6.0		*
Commtact	2.0	1MB/6.0		Free
CompileIt	1.2	1MB/6.02		Free
CompuServe Navigator ★	2.1	512K/3.2		*
Computerized Classic Accounting	2.2	1MB/6.0		*
ConcertWare	5.1	512KE/4.2		$35
Control	1.5	1MB/4.1		Free
Cue	3.0	1MB/6.03		*
DataDesk	3.0	512K/4.02		$125
DataMerge	2.0	512K/3.2		Free
dBase Mac ★	1.01	1MB/4.1		Free
Deluxe Music Construction Set	2.5	512K/6.02	9/89	*
D.E.S.	4.0	1MB/6.0		*
Design Dimensions ★	2.15	5MB/6.03		Free
DeskPaint ★	2.1C	512KE/4.2	5/90	Free
DiagramMaker ★	1.1	1MB/6.02		*
Digital Darkroom	1.1	1MB/6.02		Free
DiskFit, Network DiskFit ★	1.5	512K/4.1		*
DiskTop	4.0	1MB/6.0		*
Display AdBuilder	1.1	1MB/6.03		*
Dollars and Sense	4.1	512KE/3.2		*
DragonWave	1.1	1MB/6.03		*
Dreams	1.1	1MB/6.02		*
DynoDex ★	1.1	1MB/6.0		Free
Easy Color Paint	1.1	1MB/6.0		*
Empower ★	2.05	1MB/5.0	6/89	Free
Empower II ★	2.07	1MB/5.0		*
EndLink	1.1	512K/3.2		Free
EndNote	1.2	512KE/3.2	6/89	Free
Extender GrafPak	3.0	1MB/6.02		$30
Falcon	2.1	1MB/3.2		Free
Fastback II	2.1	512KE/4.1	12/89	$25
Fast Forms ★	1.2	512K/3.2		$25
Ferrari Grand Prix ★	1.6	512K/3.2		$10
FetchIt	2.0	512K/6.01		*
FileMaker II ★	1.1	1MB/4.2		*
Finale	2.0	1MB/6.02		Free
Financial Analysis	3.0	512K/3.0		*
Findswell	2.0	512KE/3.2	3/90	*
Fontographer	3.0	1MB/6.0		*
FontShare	2.0	1MB/6.0		Free
FormsProgrammer ★	2.03	1MB/6.02		$15
FoxBase+/Mac ★	2.10	1MB/6.0		$75
Freedom of Press ★	2.2	1MB/6.0		Free
FreeFlow	3.0	1MB/6.03		Free
Full Impact ★	1.1	1MB/6.0		Free
FullWrite Professional ★	1.1	2MB/6.02		Free
Gofer ★	2.01	1MB/4.1		$25
Grafpoint	2.0	2MB/6.0		*
Great Plains Accounting Series	5.2	1MB/6.0		*
Help DA	3.0	1MB/6.0		Free
HFS Backup	3.0	512K/3.2	8/89	$35
Hybase ★	1.1	1MB/6.0		Free
HydroMac	2.0	1MB/6.0		*
HyperAnimator ★	1.5	1MB/6.03	6/89	$29.95
HyperCard ★	1.2.2	1MB/6.03		$10
HyperDA ★	1.2	512K/3.2		$10
HyperEngine Developer's Tool ★	1.1	1MB/6.03		Free

(continues)

Bold = *first time the product is being listed.*

★ = *minor update.*

Req. = *min. RAM and system software required.*

Rev. = *last time(in past year) reviewed this or an earlier version.*

Price = *cost for update to registered owners.*

* = *contact your dealer for update policy.*

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PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
HyperLibrary	2.0	1MB/5.0		*
HyperPort Chess	2.0	1MB/6.0		$10
HyperWindows ★	1.1	1MB/6.02		Free
Icon-It	2.0	1MB/6.02		$29
Iconia ★	7.0	1MB/6.0		*
Igor ★	1.1	1MB/6.0	5/90	Free
Imago Grabber	2.0	1MB/6.02		Free
ImageStudio	2.0	1MB/6.0		Free
ImageWriter LQ Print Driver ★	2.0	512K/3.2		Free
In-CAD	2.0	2MB/6.0		*
InfoLogic Envelope ★	6.0	512KE/4.0		$5
Insight Expert Accounts Payable	2.2	1MB/6.0		*
Insight Expert Accounts Receivable	2.2	1MB/6.02		*
Inspiration	2.0	1MB/4.2		Free
Instant-Expert Plus	3.0	1MB/5.0		Free
JetLink Express ★	1.01	1MB/6.0		Free
KidsTime ★	1.2	512K/3.2		$15
KiwiEnvelopes	3.0	512KE/4.1		$10
Language Systems Fortran Compiler ★	1.2	1MB/6.03		*
LapLink Mac	2.0	512K/2.0		Free
LaserPaint Color II ★	1.02	1MB/6.03		Free
LetrTuck +	2.0	512K/3.2		$20
Lookup	2.0	1MB/6.0		*
Mac86	2.0	1MB/6.02		$10
Mac286	2.0	1MB/6.02		$10
Mac3270	2.0	1MB/6.03		*
MacAnalyst	2.0	2MB/6.0		$125
MacArchitrion	4.0	2MB/6.03		Free
MacAtlas Paint	2.0	512K/3.2		$35
MacClint ★	1.1	1MB/5.0		Free
MacConcept	3.0	1MB/6.03		*
MacDesigner	3.0	2MB/6.0		$125
MacDraw II	1.1	1MB/6.0		*
MacEnvelope	4.1	512K/3.2		*
MacFalcon	2.1	1MB/6.03		*
MacFlow	3.0	1MB/6.03		$30
MacFortran	2.4	512K/4.2		*
MacFortran/020	2.4	512K/4.2		*
MacFortran for MPW	1.1	2MB/6.02		Free
MacHerbal	2.0	512K/3.2		$49
MacHotel	3.3	1MB/6.03		Free
MacLine	3.0	512K/3.0		$25
MacLinkPlus/Wang VS	4.0	512KE/3.2		$45
MacMainFrame 3270/CUT	2.1	2.5MB/6.02		$100
MacPhonebook	2.0	512KE/3.2	1/90	*
MacPrint	1.1	1MB /6.02		Free
MacProject II	2.0	1MB/6.0	8/89	*
MacProof ★	3.2.1	1MB/6.02	2/90	$30
MacRecorder	2.0	512K/3.2	12/89	*
MacSchedule	2.0	1MB/6.0		$30
MacSmarts	3.0	1MB/6.0		*
MacTell	3.5	512K/3.0		*
MacTerminal ★	2.31	512K/3.2		Free
MacToPic	2.0	1MB/6.0		$25
MacVision	2.1	1MB/4.2	7/89	*
MacWrite II	1.1	1MB/6.0		Free
Managing Your Money	3.0	1MB/6.03		$49.95
MapGrafix	2.0	4MB/6.03		Free
MarketMaster	II+	1MB/6.03		$25
Master Tracks Pro	4.0	1MB/4.1		$45
MathType	2.0	512K/6.02	11/89	*
Matlab	1.2	1MB/3.0		*
MaxPage ★	1.2	512K/3.2		Free
McClint	2.0	1MB/4.2		$25
McCPrint	2.0	512K/4.2		$25
McMax	2.0	1MB/5.0	8/89	*
Memorybank Manager	3.0	1MB/6.0		Free
MGMStation ★	2.5	512KE/3.0		*
MicroPhone II	3.0	512KE/4.2		*
Microsoft File	4.0	512K/3.2		*
Microsoft Mail	2.0	1MB/6.02	1/90	*
Microsoft Word	4.0	512KE/3.2	10/89	*
Microsoft Works	2.0	512K/6.0		*
MindWrite ★	2.1	512KE/4.2		*
MiniCad +	2.0	1MB/6.0	11/89	*
MiniDraw	4.0	512KE/4.2		$17
MockPackage Plus Utilities	4.4	512KE/3.2		$15
Modern Artist	2.0	2MB/6.02		$150
MOMARS	3.1	1MB/6.03		*
Monte Carlo	2.0	1MB/6.03		$60
More II ★	2.01	1MB/4.1	6/89	Free
MSFL: Pro League Football	2.0	1MB/6.0		*
MultiLedger ★	1.1	512K/3.2		Free
Multi-User Appointment Diaries	3.01	512K/3.2		*
Music Publisher	2.0.3	1MB/6.0		Free
MyTimeManager	2.0	1MB/6.0		*
Navigate	2.0	1MB/6.0		Free
Nemesis Go Master	4.0	512K/4.1	6/89	*
The NightWatch ★	1.03	512KE/3.2		*
Nisus	2.0	1MB/6.02	9/89	Free
NuPaint ★	1.04	512K/3.2		Free
Nutrition Stack	2.0	1MB/6.02		$20
OmniPage ★	2.1	1MB/6.02		Free
Omnis 3 Plus/Express	2.0	512KE/3.2		*
On Schedule	2.0	1MB/3.0		*
P51 Mustang Flight Simulator	2.04	512K/3.2		$10
PacerLink	5.0	512K/5.0		*
Panorama	1.1	1MB/4.2		Free
PEGASYS II	3.2	1MB/6.03		Free
Performer Sequencer ★	3.2	1MB/6.0		Free

(continues)

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PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
Personal Golf Stats	2.0	512K/3.2	2/90	Free
Personal Reference Catalog	2.0	1MB/6.0		$10
Personal Phone ★	1.1	1MB/6.0		*
PICT Detective	2.0	512KE/6.0		$20
PixelPaint ★	1.2	2MB/4.1		Free
Plains & Simple ★	1.06	1MB/3.2		*
PowerDraw	3.0	1MB/6.0		*
PowerStation ★	2.5.2	512K/4.1		Free
PowerTools	3.0	4MB/6.0		*
Practica Musica	2.1	512K/3.2		$10
Printer Interface III	2.0	512K/6.02		$22.50
Pro-Cite ★	1.3	512K/4.1		*
Professional Composer	2.3	1MB/6.03		Free
Professional Image II	2.0	1MB/6.0		$22
The Programmer's Online Companion	2.0	1MB/6.02		$10
PropsForms	2.0	1MB/6.03		Free
Prototyper ★	2.01	1MB/4.1	9/89	$79
Publish or Perish	3.0	512KE/3.2		$10
Pyro ★	3.31	512K/4.1		$10
QuarkXPress	2.12	1MB/6.02		*
Quicken ★	1.5	512K/3.2	1/90	*
QuickLetter ★	1.02	512KE/3.2	10/89	Free
QuickMail	2.0	512KE/3.2		*
QuickShare	2.0	512KE/3.2		$75
QuickShot ★	2.1	1MB/4.2		$5
RagTime 3		2MB/6.0		$150
Read-It OCR	2.1	1MB/6.03	12/89	*
Reports ★	1.2	1MB/6.0		Free
Retail Engine	3.0	1MB/6.0		*
Sales Associate	1.10	1MB/6.03		Free
SAM	1.3	1MB/6.0		*
ScheduleMaker ★	3.01	1MB/6.0		$25
ScreenSnap ★	2.2	1MB/4.2		*
ScriptEdit	1.1	1MB/6.04		*
Second Sight	2.0	1MB/6.02		$33.75
Sentinel	2.0	512K/4.1		$20
Shanghai	2.0	1MB/6.02	2/90	$13
SimpleSpan	2.5	512K/3.2		*
Smart Alarms	2.9.1	512K/3.2		$12
SmartForm Assistant ★	1.1	1MB/6.0	7/89	Free
SmartForm Designer	1.1	1MB/6.0	7/89	Free
SmartScrap & The Clipper	2.0	1MB/6.03	9/89	$20
Snap ★	3.1	1MB/3.0	9/89	*
SoftPC Mac ★	1.3	2MB/6.0		*
Sound Designer Universal ★	1.5	512K/6.03		$45
Spellswell ★	2.2	512K/3.2	5/90	$20
Springboard Publisher	2.0	1MB/6.0		*
Stepping Out II	2.0	1MB/4.1		Free
StickyBusiness	1.06	512KE/6.03		Free
Still Light	3.0	1MB/6.0		Free
StrataVision 3d ★	1.02	2MB/6.03		Free
Suitcase II	3.0	512KE/4.1	10/89	$25
Super 3d	2.0	512KE/6.02	10/89	$200
SuperGlue II with GlueNotes	2.1	1MB/6.0	1/90	*
SuperLaserSpool	2.0	512K/4.1		$20
SuperPaint	2.0	1MB/6.02	8/89	$50
SuperSpool	5.0	512K/4.1		$20
Synchronicity	2.0	512KE/3.2	12/89	$5.00
Systat ★	3.2	1MB/6.0		$75
Teacher's Rollbook ★	2.2	512K/3.2		$17.95
Ternary Plot	3.0	512K/3.2		*
TextPert ★	3.01	1MB/6.0		Free
Think C	4.0	1MB/5.0	2/90	*
Timbuktu	3.0	1MB/4.1		Free
TimeMinder	2.0	1MB/4.2	9/89	$50
Timeslips III	1.2	512KE/4.2	2/90	$50
TML Pascal II	3.0	1MB/5.0	6/89	$79.95
TMON ★	2.8.4	512K/4.0		*
TOPS/Mac	2.1	512K/3.2		*
Trapeze ★	2.1	1MB/6.0		$35
TrueBASIC ★	2.02	1MB/6.0		Free
TrueForm ★	1.1	1MB/6.2	4/90	Free
Turbosynth	2.0	1MB/6.03		$35
Typeface Library	1.5	1MB/6.03		*
UNITize ★	1.3	512KE/3.2	10/89	$20
UpBeat	2.0	1MB/6.0		$75
VersaCAD/ Macintosh Edition ★	2.11	1MB/6.0		Free
Virex ★	2.2	1MB/4.2	1/90	*
Virtual	2.0	1MB/3.2	10/89	Free
Voyager	1.2	1MB/6.0		*
VMacS	2.0	1MB/6.0		$25
Wall Street Investor	3.0	1MB/5.0		$150
White Knight	11	1MB/6.02		$35
Wingz ★	1.1	1MB/6.0	6/89	Free
Word Finder	2.0	512K/3.2		*
WordPerfect for the Macintosh ★	1.0.3	1MB/4.2		Free
WorksPlus Spell	2.0	1MB/6.03	1/90	*
WriteNow	2.0	512K/3.2	5/89	*

To have products listed in this section, send upgraded software, an outline of changes since the previous release (indicate if it's a maintenance upgrade), upgrade price, minimum RAM and system software, suggested retail price, company name, mailing address, and phone number to *Updates, Macworld,* 501 Second St., San Francisco, CA 94107.



Tom Tjelmeland
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"Our business was going through the roof, but our old accounting system was holding us down.

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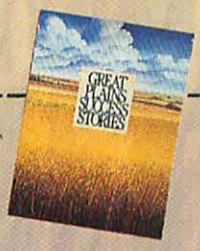
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MW590

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Macintosh computer and new Kodak Diconix printer

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WHERE TO BUY

A Guide to Products Featured in This Issue

This listing provides companies and phone numbers for products mentioned in this issue. Allow several weeks for responses to reader service card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service

701 **4th Dimension** ACIUS, Inc.; 408/252-4444, 800/538-8157.

A

702 **Abaton 8-bit Upgrade Kit** Abaton, a Subsidiary of Everex Systems; 415/683-2226, 800/444-5321.
703 **Abbre-V-8** Abbre-V-8; 707/937-4298.
704 **Acknowledge** Prometheus Products, Inc.; 503/624-0571, 800/477-3473.
* **Address Book** Jim Leitch; 416/496-0828.
705 **Address Book Plus** Power Up Software Corp.; 415/345-5900, 800/851-2917.
Adobe Separator Adobe Systems, Inc.; 415/961-4400; 800/833-6687.
706 **Aldus PageMaker** Aldus Corporation; 206/628-2320.
707 **America Online** Quantum Computer Services, Inc.; 703/448-8700, 800/227-6364.
708 **Apple Modem 2400** Apple Computer, Inc.; 408/996-1010.
709 **Apple Personal Modem** Apple Computer, Inc.; 408/996-1010.
710 **The Art Importer** Altsys Corp.; 214/424-4888.
711 **Audiomedia** Digidesign, Inc.; 415/327-8811, 800/333-2137.

Reader Service

B

712 **BizPlanBuilder** Jian; 415/941-9191, 800/442-7373.

C

713 **Cause** Maxem Corp.; 602/491-2466, 800/336-6296.
714 **ClickWriter** StackWorks, Inc.; 217/328-5257.
715 **The Complete Half-Page Scanner/400, The Complete Page Scanner** The Complete PC; 408/434-0145, 800/634-5558.
716 **CompuServe Information Service** CompuServe, Inc.; 614/457-8600.
717 **Connect Business Information Network** Connect, Inc.; 408/973-0110, 800/262-2638.
718 **The Cordless Mouse** Mobius Technologies, Inc.; 415/654-0556, 800/669-0556.

D

719 **DAtabase** Preferred Publishers, Inc.; 901/683-3383, 800/446-6393.
720 **DeltaGraph** DeltaPoint, Inc.; 408/648-4000, 800/367-4334.
721 **DesignStudio** Letraset Graphic Design Software; 201/845-6100, 800/343-8973.
722 **DeskPaint & DeskDraw** Zedcor, Inc.; 602/881-8101, 800/482-4567.
723 **Desktop Express** Dow Jones & Co., Inc.; 609/520-4000.
724 **Double Helix** Odesta Corp.; 708/498-5615, 800/323-5423.
725 **Dow Jones News/Retrieval** Dow Jones & Co., Inc.; 609/520-4000.
* **DynoDex** Portfolio Systems, Inc.; 800/729-3966.

Reader Service

E

726 **E-Z Online** Dow Jones & Co., Inc.; 609/520-4641, 609/520-4642.

F

727 **Felix** Altra; 307/745-7538, 800/726-6153.
728 **Finale** Coda Music Software; 612/854-1288.
729 **Fontographer** Altsys Corp.; 214/424-4888.
730 **FoxBase+/Mac** Fox Software, Inc.; 419/874-0162.
731 **FrameMaker** Frame Technology, Inc.; 408/433-3311, 800/843-7263.

G

* **GEnie** General Electric Information Services; 800/638-9636.

H

732 **HyperCard** Apple Computer, Inc.; 408/996-1010.
733 **HyperDA** Symmetry Software Corp.; 602/998-9106, 800/624-2485.
734 **HyperDialer** Datadesk International, Inc.; 818/998-4200, 800/826-5398.

I

735 **Igor** WaveMetrics; 503/635-8849.
736 **Insight OneWrite** Layered, Inc.; 617/242-7700, 800/622-4436.
737 **Interleaf Publisher** Interleaf, Inc.; 617/577-9800.

J

738 **JMP** SAS Insititute, Inc.; 919/677-8000.

K

739 **KiwiEnvelopes** Kiwi Software, Inc.; 805/685-4031.

Reader Service

L

740 **Letter Writer Plus** Power Up Software, Inc.; 415/345-5900, 800/223-1479 in CA, 800/851-2917.
741 **Lookup** Working Software, Inc.; 408/423-5696.

M

742 **Macintosh Display Card 4•8** Apple Computer, Inc.; 408/996-1010.
743 **Macintosh Display Card 8•24** Apple Computer, Inc.; 408/996-1010.
744 **Macintosh Display Card 8•24 GC** Apple Computer, Inc.; 408/996-1010.
745 **Macintosh IIfx** Apple Computer, Inc.; 408/996-1010.
746 **MacKnowledge** Prometheus Products, Inc.; 503/624-0571, 800/477-3473.
747 **MacMoney** Survivor Software Ltd.; 213/410-9527.

MAC TO VAX PRODUCTS

748 Alisa Systems, Inc.; 818/792-9474.
749 Apple Computer, Inc.; 408/996-1010.
* APDA Apple Computer, Inc.; 800/282-2732.
750 Cayman Systems, Inc.; 617/494-1999.
751 CompuServe Data Technologies; 617/661-9440, 800/873-1032.
752 Computer Methods Corp.; 609/596-4360, 800/969-4360.
753 Datability Software Systems, Inc.; 212/807-7800, 800/342-5377.
754 Deft; 416/249-2246.
755 EMAC, a Division of Everex Systems Inc.; 415/683-2335,

(continues)

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800/821-0806.

756 Integrated Solutions, Inc.; 215/337-2282.

757 Intercon Systems Corp.; 703/450-7117.

758 Interpreter, Inc.; 303/431-8991, 800/232-4687.

759 Keyword Office Technologies, Ltd.; 403/250-1770, 800/661-8161.

* List SpA; Piazza Mazzini 6, Pisa, Italy 156100.

760 Mt Xinu, Inc.; 415/644-0146.

761 Novell, Inc.; 801/379-5900, 800/526-5463.

762 Odesta Corp.; 708/498-5615, 800/323-5423.

763 Oracle Corp.; 415/598-8000, 800/345-3267.

764 Orchid Technology; 415/683-0373, 800/767-2443.

765 Pacer Software, Inc.; 619/454-0565.

766 Software AG; 703/860-5050.

767 Sybase, Inc.; 415/596-3500, 800/879-2273.

768 Techgnosis, Inc.; 407/997-6687.

* Telos Corp.; 213/450-2424.

769 Touch Communications, Inc.; 408/438-4800.

770 Touchstone Software Corp.; 213/598/7746, 800/531-0450.

771 White Pine Software, Inc.; 603/886-9050.

772 The Wollongong Group, Inc.; 415/962-7100, 800/962-8649.

773 **Managing Your Money** Meca Ventures, Inc.; 203/226-2400.

774 **MapMaker** Strategic Mapping, Inc.; 408/985-7400.

775 **MarkUp** Mainstay; 818/991-6540.

776 **MCI Mail** MCI; 202/293-4255, 800/444-6245.

777 **MicroPhone II** Software Ventures Corp.; 415/644-3232.

* **Microsoft Works** Microsoft Corp.; 206/882-8080, 800/426-9400.

778 **MicroTV** Aapps Corp.; 408/735-8550.

MODEMS

780 Abaton, a Subsidiary of Everex Systems; 415/683-2226, 800/444-5321.

781 Apple Computer, Inc.; 408/996-1010.

782 Applied Engineering, Inc.; 214/241-6060.

783 Beverly Hills Computer, Inc.; 213/273-3710, 800/426-8166.

784 Bizcomp Corp.; 408/733-7800.

785 Bytcom, Inc.; 415/485-0700, 800/227-3254.

* Circuit Research Corp.; 603/880-4000.

786 Codex Corp.; 617/364-2000.

787 Computer Friends, Inc.; 503/626-2291, 800/547-3303.

* CRX/Anderson Jacobson; 408/435-8520, 800/423-6035.

788 E-Tech Research, Inc.; 408/982-0270.

789 EMAC, a Division of Everex Systems Inc.; 415/683-2335, 800/821-0806.

790 Gandalf Data, Inc.; 708/541-6060, 800/426-3253.

791 General DataComm, Inc.; 203/574-1118.

792 GVC Technologies, Inc.; 201/579-3630, 800/289-4821.

793 Hayes Microcomputer Products, Inc.; 404/441-1617.

794 Intel, PCEO Division; 503/629-7600, 800/538-3373.

795 Jasmine Technologies, Inc.; 415/282-1111.

796 La Cie, Ltd.; 503/684-0143, 800/999-0143.

797 MacProducts USA; 512/343-9560, 800/622-3475.

798 MacZone, Inc.; 800/248-0800.

799 Microcom, Inc.; 617/551-1000, 800/822-8224.

800 Multi-Tech Systems, Inc.; 612/785-3500, 800/328-9717.

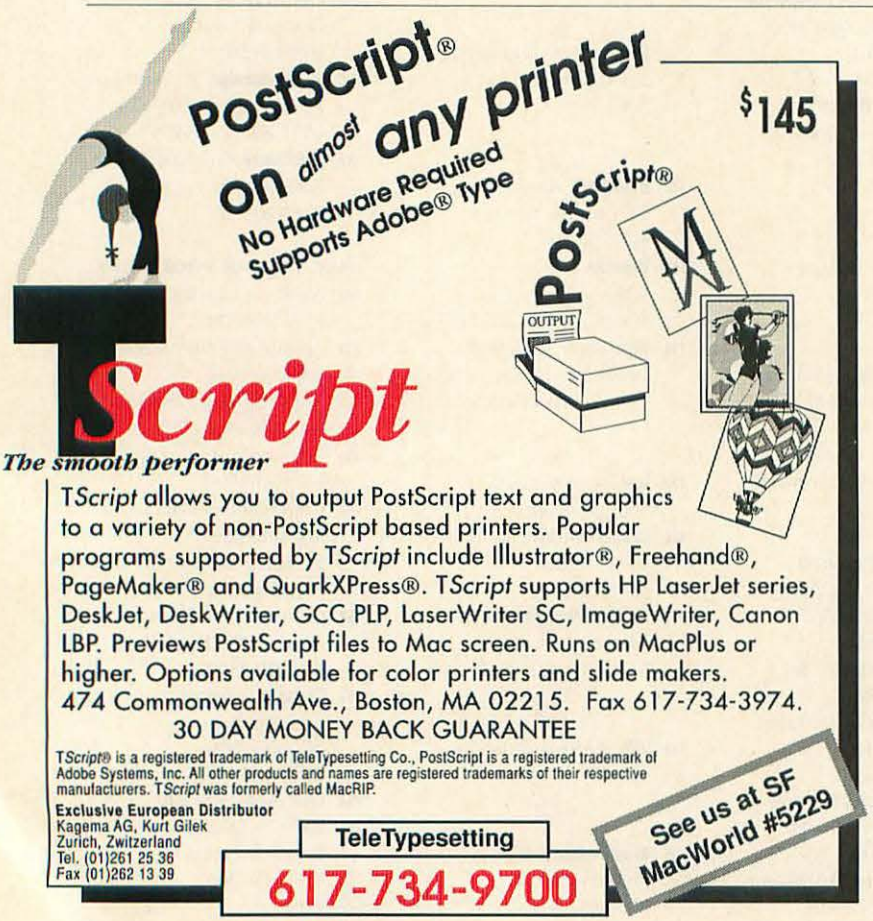
801 Novation/RJD Associates, Inc.; 714/841-8791.

802 OmniTel, Inc.; 415/490-2202.

* Orchid Technology; 415/683-0373, 800/767-2443.

803 Practical Peripherals; 818/706-0333.

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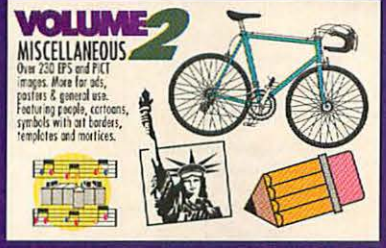
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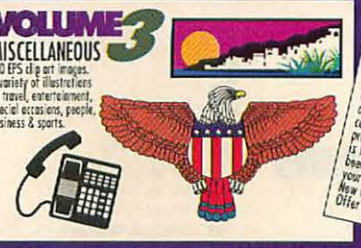
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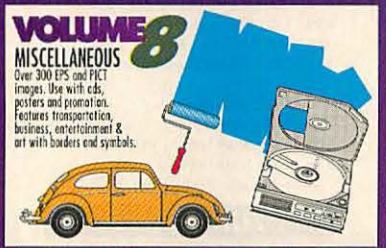


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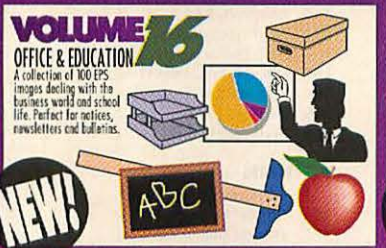


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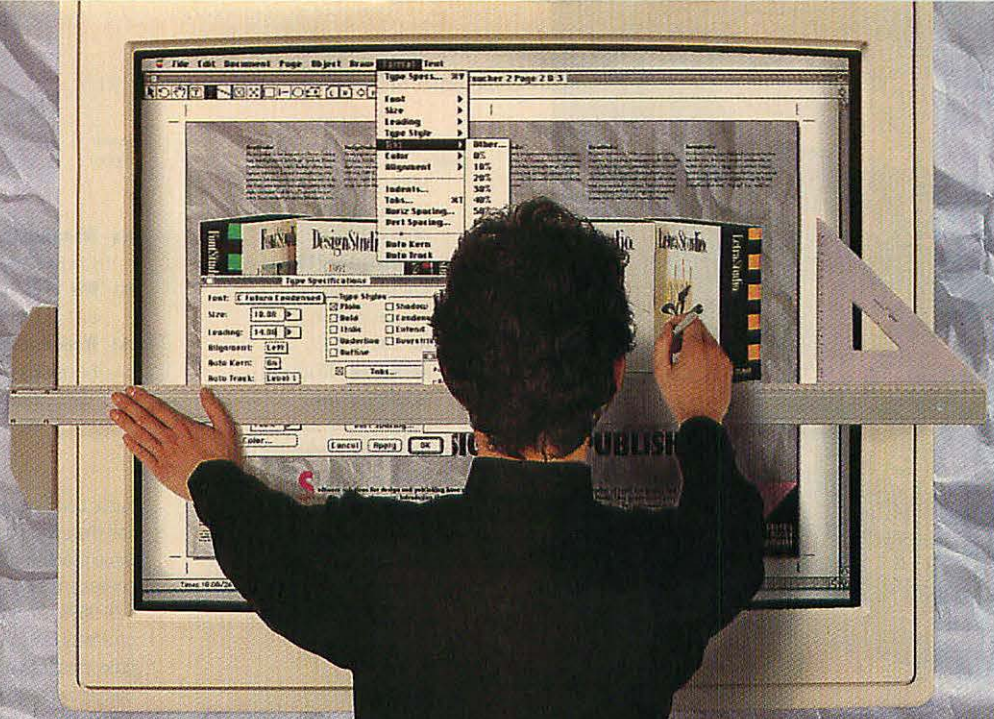
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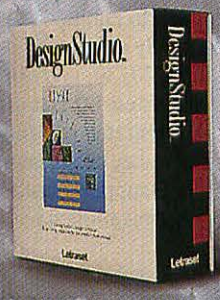
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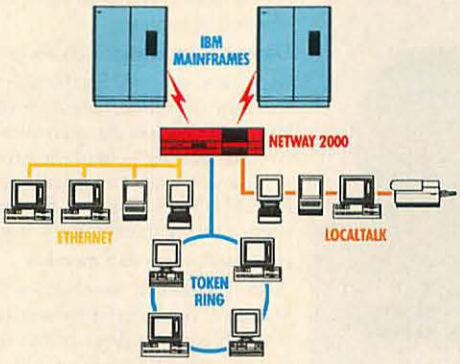
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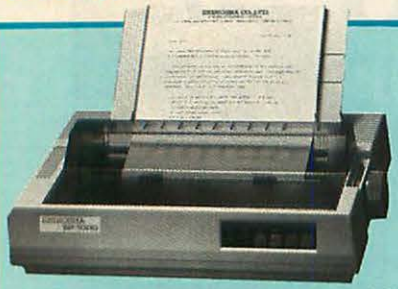
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Hard Drives

CMS Externals

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MacStack 30...28ms$488
MacStack 45...28ms$548
MacStack 60...38ms$648
MacStack 80...28ms$748
PD 100...25ms$898
PD 170...18ms $1498
44 Megabyte Removable$798

CMS Internals

(SE, II, IIcx, IIci)
40 Megabyte$448
100 Megabyte$848
200 Megabyte $1498

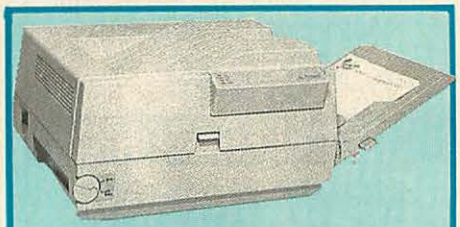
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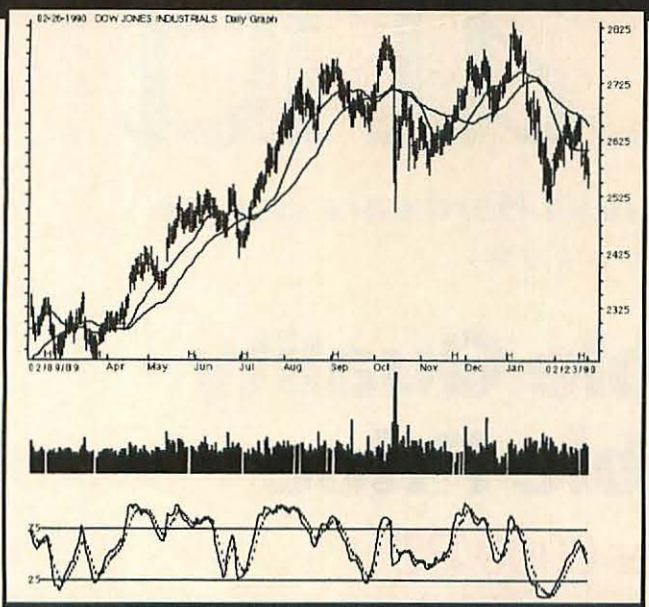
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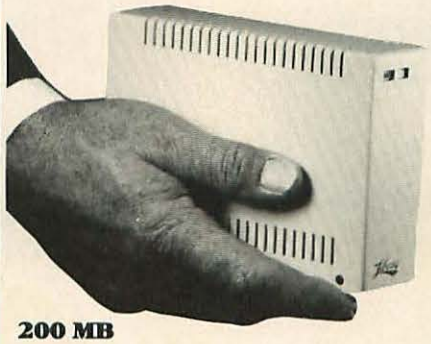
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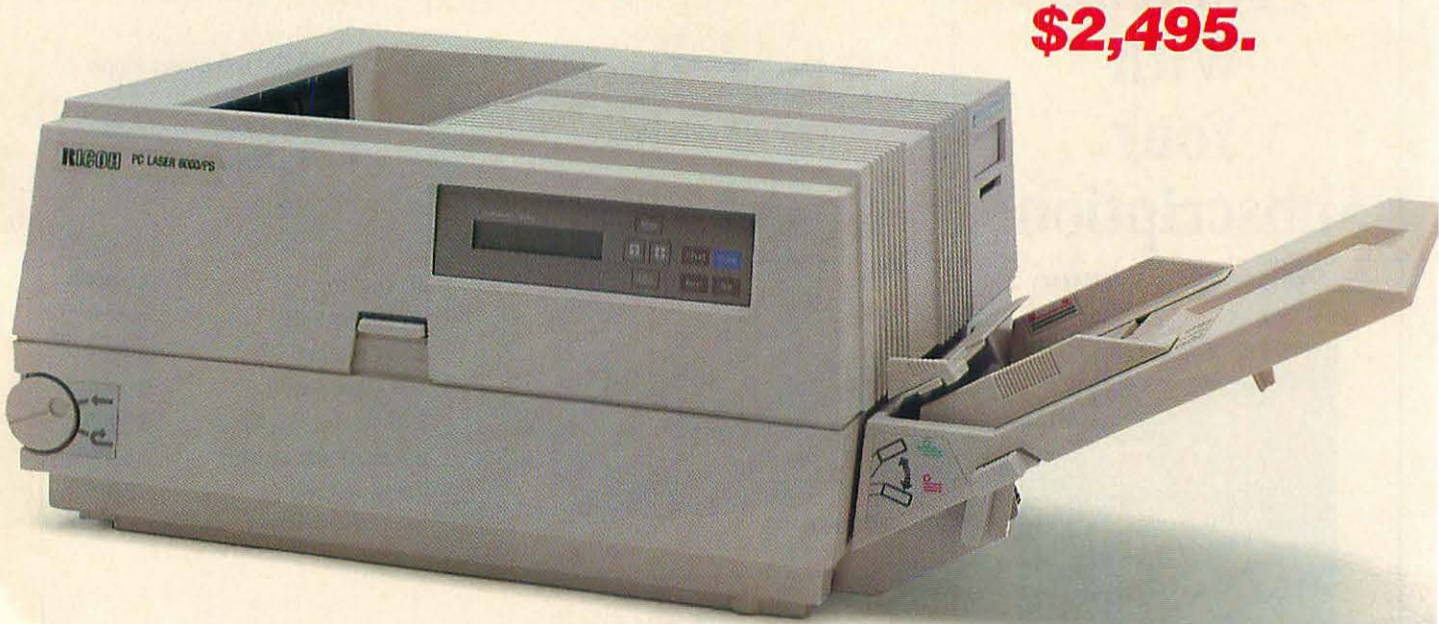
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Externals

	Retail Price	Sale Price
20 Megabyte		
CMS Enhancements 20 *32ms*	~~$725.~~	**$429.**
PowerDrive 20 *40ms*	~~$649.~~	**$344.**
Seagate 20 *40ms*	~~$725.~~	**$359.**
30 Megabyte		
Caché Systems 30 *28ms*	~~$799.~~	**$489.**
CMS Enhancements 30 *32ms*	~~$799.~~	**$489.**
PowerDrive 30 *40ms*	~~$699.~~	**$389.**
Seagate 31 *40ms*	~~$749.~~	**$399.**



Quantum Hard Disk Drives

Industry leading Quantum quality, dependability and fast access speeds at affordable prices. Backed by our *Two Year Warranty*, all Quantum drives come complete with cables and software.

40 Megabyte		
Caché Systems 45 *28ms*	~~$899.~~	**$549.**
CMS Enhancements 45 *32ms*	~~$935.~~	**$589.**
PowerDrive 45 *40ms*	~~$799.~~	**$449.**
Quantum 40 *19ms* (2 Year Warranty!)	~~$999.~~	**$519.**
Seagate 46 *40ms*	~~$899.~~	**$449.**
60 Megabyte		
Caché Systems 60 *28ms*	~~$999.~~	**$579.**
CMS Enhancements 60 *40ms*	~~$1,025.~~	**$635.**
PowerDrive 60 *28ms*	~~$799.~~	**$539.**
Seagate 62 *28ms*	~~$999.~~	**$549.**
80 Megabyte		
Caché Systems 80 *28ms*	~~$1,199.~~	**$679.**
CMS Enhancement 81 *28ms*	~~$1,299.~~	**$779.**
PowerDrive 80 *28ms*	~~$799.~~	**$588.**
Quantum 80 *19ms* (2 Year Warranty!)	~~$1,399.~~	**$769.**
Seagate 81 *28ms*	~~$1,199.~~	**$589.**
100-200 Megabyte		
Caché Systems 150 *16ms*	~~$2,499.~~	**$1,299.**
Caché Systems 150/150 Tape *16ms*	~~$3,299.~~	**$2,159.**
Imprimis-MacWren 170 *16ms*	~~$2,599.~~	**$1,499.**
Quantum 105 *19ms* (2 Year Warranty!)	~~$1,999.~~	**$819.**
Quantum 120 *15ms* (2 Year Warranty!)	~~$2,499.~~	**$999.**
Quantum 170 *15ms* (2 Year Warranty!)	~~$2,999.~~	**$1,099.**
Quantum 210 *15ms* (2 Year Warranty!)	~~$3,499.~~	**$1,199.**
300-600 Megabyte		
CMS Enhancements PD 300 *16ms*	~~$4,295.~~	**$2,395.**
CMS Enhancements PD 600 *16ms*	~~$5,845.~~	**$3,485.**
Imprimis - MacWren 300 *16ms*	~~$4,295.~~	**$1,849.**
Imprimis - MacWren Runner 320 *10.7ms*	~~$4,895.~~	**$2,199.**
Imprimis - MacWren 600 *16ms*	~~$5,699.~~	**$2,599.**

SE, SE30 & IIcx, IIci Internals

20 Megabyte		
Seagate 20 *40ms*	~~$599.~~	**$299.**
30 Megabyte		
Caché Systems 30 *28ms*	~~$649.~~	**$375.**
CMS Enhancements Pro 30 *38ms*	~~$649.~~	**$399.**
Seagate 31 *40ms*	~~$649.~~	**$349.**
40 Megabyte		
Caché Systems 45 *28ms*	~~$815.~~	**$449.**
CMS Enhancements Pro 45 *32ms*	~~$825.~~	**$469.**
Quantum 40 *19ms* (2 Year Warranty!)	~~$899.~~	**$399.**
Seagate 46 *40ms*	~~$799.~~	**$399.**
60 Megabyte		
Seagate 62 *28ms*	~~$999.~~	**$499.**
80 Megabyte		
Quantum 80 *19ms* (2 Year Warranty!)	~~$1,299.~~	**$649.**
100-170 Megabyte		
Quantum 105 *19ms* (2 Year Warranty!)	~~$1,899.~~	**$699.**
Quantum 120 *15ms* (2 Year Warranty!)	~~$2,399.~~	**$899.**



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Quantum 210 *15ms* (2 Year Warranty!)	~~$3,399.~~	**$1,099.**

Mac II & IIX Internals



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Hard disk drives, tape back ups, removable hard drives, high capacity drives, CMS has them all and we carry their full line.

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Seagate 20 *40ms*	~~$599.~~	**$299.**
30 Megabyte		
Seagate 31 *40ms*	~~$649.~~	**$349.**
40 Megabyte		
Caché Systems 45 *28ms*	~~$599.~~	**$449.**
CMS Enhancements Pro 45 *32ms*	~~$569.~~	**$469.**
Quantum 40 *19ms* (2 Year Warranty!)	~~$899.~~	**$399.**
Seagate 46 *40ms*	~~$799.~~	**$399.**
60 Megabyte		
Caché Systems 60 *28ms*	~~$639.~~	**$499.**
CMS Enhancements Pro 60 *40ms*	~~$649.~~	**$579.**
Seagate 62 *28ms*	~~$649.~~	**$475.**
80 Megabyte		
Caché Systems 80 *28ms*	~~$729.~~	**$575.**
CMS Enhancements Pro 80 *28ms*	~~$749.~~	**$669.**
Quantum 80 *19ms* (2 Year Warranty!)	~~$1,299.~~	**$649.**
Seagate 81 *28ms*	~~$749.~~	**$499.**
100-170 Megabyte		
Caché Systems 150 *16ms*	~~$1,429.~~	**$1,199.**
CMS Enhancements PI 170 *16ms*	~~$1,699.~~	**$1,499.**
Imprimis-MacWren 170 *16ms*	~~$2,499.~~	**$1,399.**
Quantum 105 *19ms* (2 Year Warranty!)	~~$1,899.~~	**$699.**
Quantum 120 *15ms* (2 Year Warranty!)	~~$2,399.~~	**$899.**
Quantum 170 *15ms* (2 Year Warranty!)	~~$2,899.~~	**$999.**
Quantum 210 *15ms* (2 Year Warranty!)	~~$3,399.~~	**$1,099.**
300-600 Megabyte		
CMS Enhancements PI 300 *16ms*	~~$4,395.~~	**$2,195.**
CMS Enhancements PI 600 *16ms*	~~$5,995.~~	**$3,499.**
Imprimis - MacWren 300 *16ms*	~~$4,395.~~	**$1,799.**
Imprimis - MacWren Runner 320 *10.7ms*	~~$4,695.~~	**$2,149.**
Imprimis - MacWren 600 *16ms*	~~$5,995.~~	**$2,549.**

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PowerDrive 44 *25ms*	~~$1,295.~~	**$699.**
40-150 Megabyte Tape Back-Ups		
Caché 150 Tape	~~$1,399.~~	**$789.**
CMS Enhancements 60	~~$995.~~	**$649.**
CMS Enhancements 150	~~$1,445.~~	**$849.**
Irwin 40 Meg Tape	~~$1,395.~~	**$949.**
Irwin 80 Meg Tape	~~$1,695.~~	**$1,149.**
SyQuest Removable Cartridges		
(Will fit *any* 44 Removable Drive)	~~$195.~~	**$89.**

Printers

Hewlett Packard		
DeskWriter	~~$1,299.~~	**$849.**
Kodak		
Diconix Portable Printer	~~$899.~~	**$514.**
Ricoh		
Ricoh PostScript Laser Printer	~~$3,495.~~	**$2,495.**
Qume		
Crystal Print Publisher	~~$4,495.~~	**$2,749.**
ScripTEN Postscript Laser Printer	~~$4,495.~~	**$2,999.**



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Hewlett Packard ScanJet W/Interface	~~$2,190.~~	**$1,499.**
Microtek MS II Sheet Feed	~~$1,495.~~	**$1,049.**
Microtek MSF 300GS	~~$2,195.~~	**$1,479.**
Microtek MSF 300Z - Color W/Interface	~~$2,695.~~	**$1,975.**



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Qume		
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Qume Portrait Monitor SE, II, IIcx, IIci	~~$1,149.~~	**$799.**

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RasterOps 19" ClearVue/ GS Gray Scale	~~$2,195.~~	**$1,599.**
RasterOps 16" 108+ Color System	~~$4,190.~~	**$2,949.**
RasterOps 19" 108+ Color System	~~$5,690.~~	**$3,699.**
RasterOps 16" 108+ SE30 Color System	~~$4,890.~~	**$2,999.**



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If you're serious about scanning, this is your scanner. Choose from 64 to 256 shades of grey or 8-bit color in flatbed or sheet feed formats. Microtek gives users the option of an external or built-in dual SCSI ports for added flexibility and convenience. The Microtek 300GS and 400GS include Digital Darkroom and Super Paint. The 300Z color scanner adds Photo Mac Edit. One year warranty.

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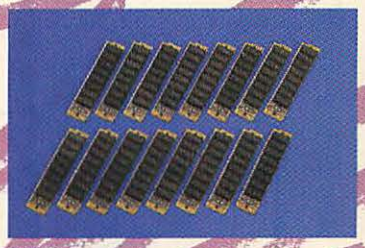
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Seagate 20	$299	$359
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Seagate 46	$399	$449
Seagate 62	$475	$549
Seagate 81	$499	$589

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RasterOps 19" 224 Color System ~~$8,190.~~ **$5,599.**
RasterOps 208 Color Board, II . . . ~~$495.~~ **$399.**
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RasterOps 264 Color Board, SE ~~$1,295.~~ **$699.**
RasterOps FrameGrabber ~~$1,995.~~ **$1,299.**



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MacLand has memory in stock! Call us for our current prices. Remember, if you bought your memory from someone else, you probably paid too much!

Samsung 15" Full Page Monitor and Card ~~$999.~~ **$599.**
Sony 1304 Color Monitor ~~$1,099.~~ **$739.**

Accelerator Boards

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Radius 25 for Mac SE **Call.**

Siclone Si3033 33Mhz for Mac II, IIx, IIcx ~~$3,995.~~ **$2,799.**
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Hayes 2400 External ~~$499.~~ **$379.**



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Hayes Interbridge ~~$799.~~ **$635.**
Telebit T-1000 9600 Baud ~~$745.~~ **$679.**
Telebit T-2500 19,200 Baud ~~$1,495.~~ **$1,229.**

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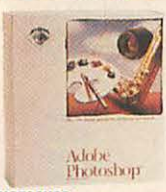
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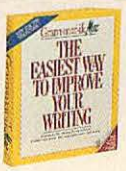
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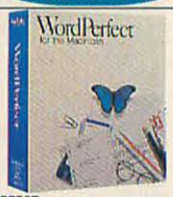
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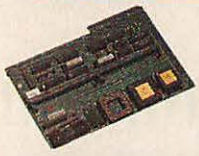


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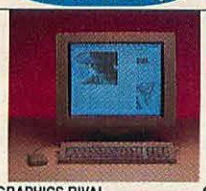
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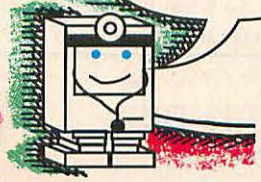
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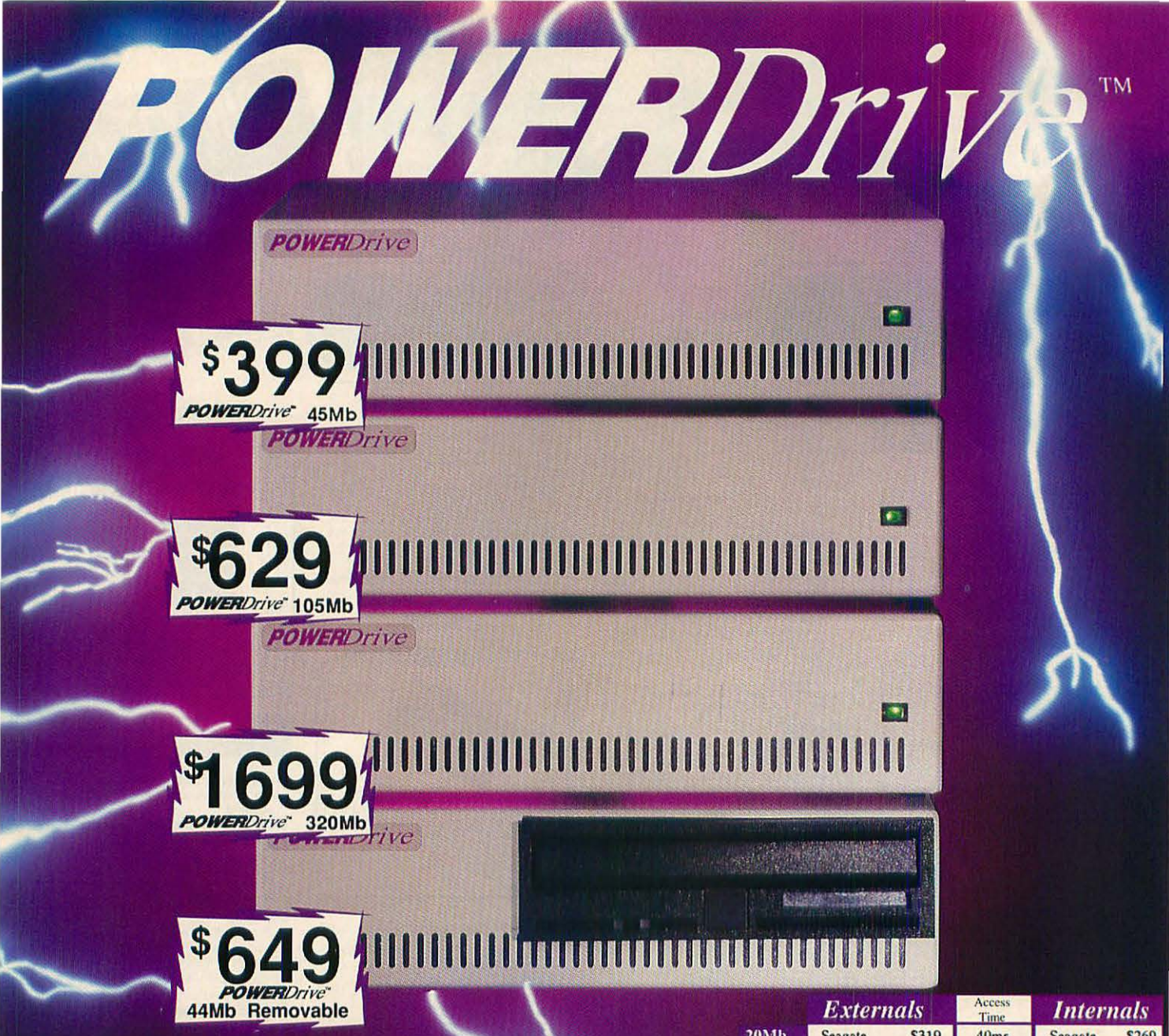
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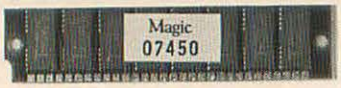


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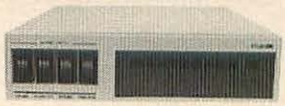
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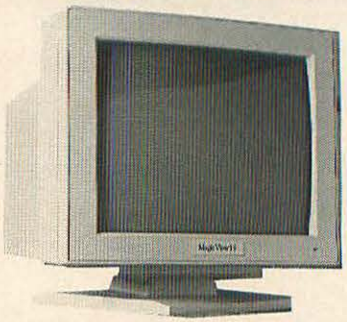
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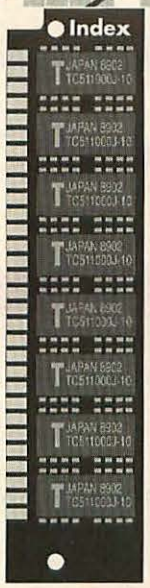
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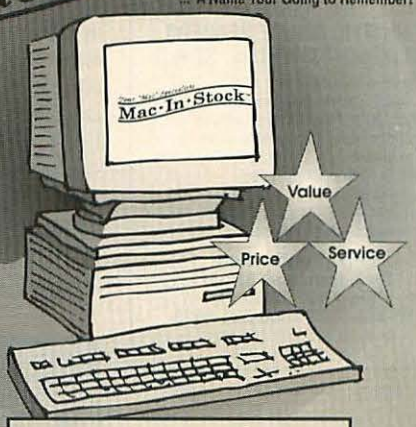
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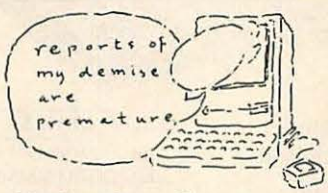
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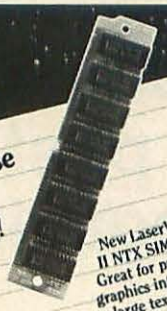
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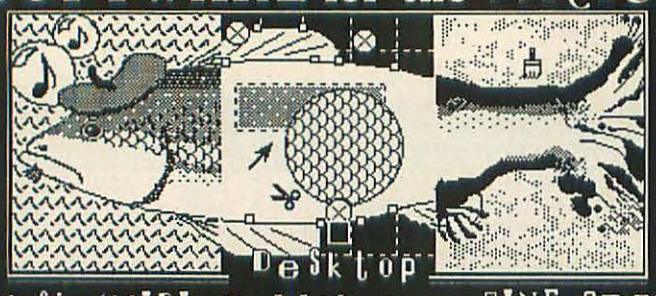
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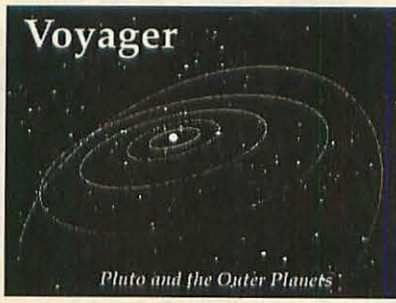
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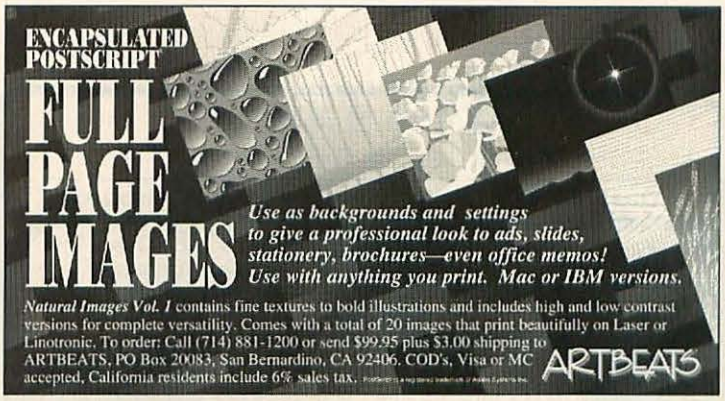


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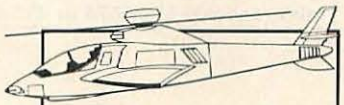
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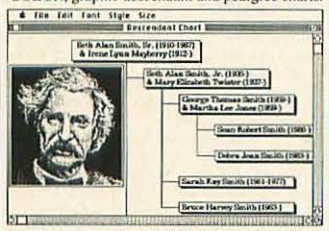
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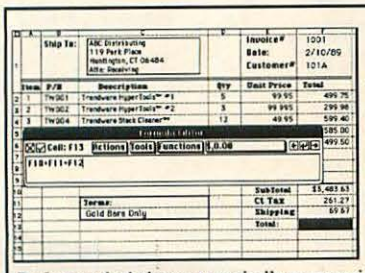
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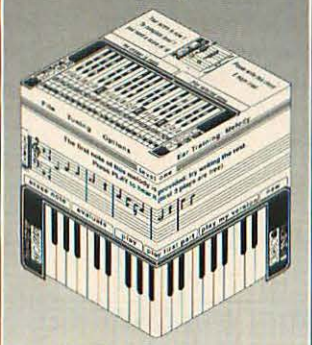
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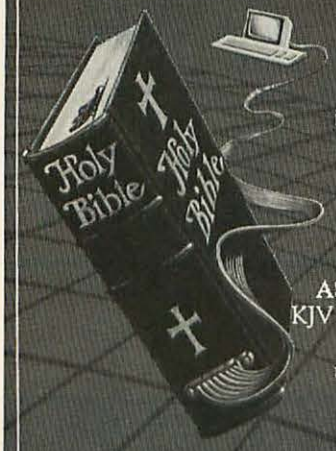
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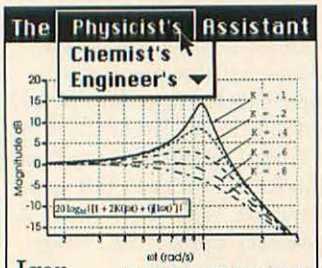
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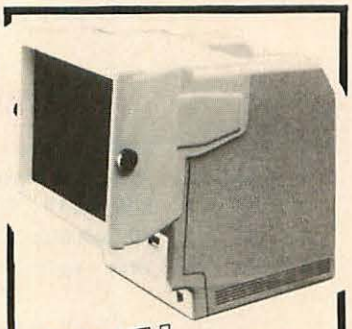
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BEST-SELLERS

BUSINESS SOFTWARE

Months on chart	Last month	This month		
60	2	1	**Microsoft Word**	Microsoft
39	1	2	**Microsoft Works**	Microsoft
51	3	3	**Microsoft Excel**	Microsoft
47	4	4	**Aldus PageMaker**	Aldus
20	7	5	**WordPerfect for the Macintosh**	WordPerfect
1	—	6	**Quicken**	Intuit
36	5	7	**MacWrite**	Claris
48	8	8	**MacDraw**	Claris
13	9	9	**FileMaker II**	Claris
6	10	10	**Wingz**	Informix

EDUCATION SOFTWARE

14	1	1	**Where in the World Is Carmen Sandiego?**	Brøderbund
27	2	2	**Reader Rabbit**	The Learning Company
43	3	3	**Math Blaster**	Davidson & Associates
6	4	4	**Math Rabbit**	The Learning Company
1	—	5	**Where in the USA Is Carmen Sandiego?**	Brøderbund

ENTERTAINMENT SOFTWARE

5	4	1	**SimCity**	Maxis Software
40	—	2	**Flight Simulator**	Microsoft
3	2	3	**Tetris**	Spectrum HoloByte
9	—	4	**Crystal Quest**	Casady & Greene
39	3	5	**Dark Castle**	Silicon Beach Software

NETWORK/DATA COMMUNICATIONS

39	1	1	**TOPS**	TOPS
35	2	2	**AppleShare**	Apple Computer
42	3	3	**LocalTalk**	Apple Computer
6	—	4	**MacLink Plus**	DataViz
8	5	5	**Netware for the Macintosh**	Novell

HARD DISKS*

20	1	1	**MacStack SD20**	CMS Enhancements
1	—	2	**Platinum PD40**	CMS Enhancements
3	—	3	**MacStack SD40**	CMS Enhancements
19	2	4	**FX20**	GCC Technologies
8	5	5	**Rodime 45 Plus**	Rodime

ADD-IN BOARDS/MEMORY

28	1	1	**Apple 2MB Memory Expansion Kit**	Apple Computer
25	3	2	**Apple 1MB Memory Expansion Kit**	Apple Computer
29	2	3	**Radius Accelerator**	Radius
5	—	4	**Microtech Memory Expansion Kit**	Microtech
4	5	5	**2MB Expansion Board**	MacProducts USA

UTILITY SOFTWARE**

1	—	1	**SAM**	Symantec
1	—	2	**Adobe Type Manager**	Adobe
1	—	3	**SUM/SUM II**	Symantec
1	—	4	**PC Tools/Mac**	Central Point Software
1	—	5	**Virex**	Versaterm

PRODUCT WATCH

Recent or forthcoming products of particular interest.

Barneyscan Multiaperature Color Slide Scanner *Barneyscan* Slide scanner

Now Utilities *Now Software* Collection of System-enhancement utilities

QuarkXPress 3.0 *Quark* Desktop publishing program

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during January 1990.

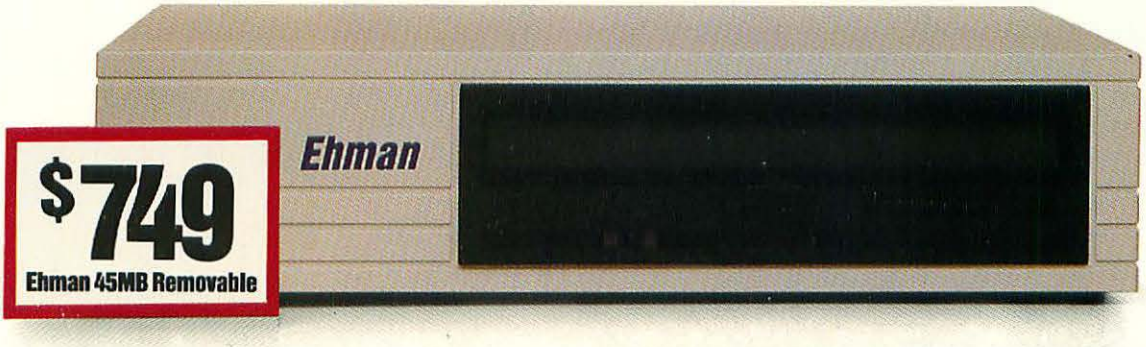
*Does not include hard disks installed at the factory.

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This is Apple's Best Buy on a Big Hard Drive;



This is Ehman's.



The perfect hard drive would have unlimited storage capacity, be lightning fast and be as reliable as rain in Seattle in the springtime. And, oh yes, it would have all of the above, at a price that would make the stingiest Scrooge smile.

Using that criteria, the Ehman 45MB removable just may be the perfect hard drive.

Its storage capability expands with your needs. For more storage capacity all you do is buy another 45MB removable cartridge for just $99. Buy as many as you need. In fact you could buy 10 cartridges, almost 500MB of storage, and still pay less than an Apple 80MB fixed hard drive.

With an access speed of just 20 ms, the Ehman removable will hold its own with just about any hard drive on the market. And with a reliability rating of 30,000 hours and a warranty of 2 years, you can be assured that in this case, speed doesn't burn. For another $20, you can have complete assurance and overnight service, with the Ehman Express Service Program.

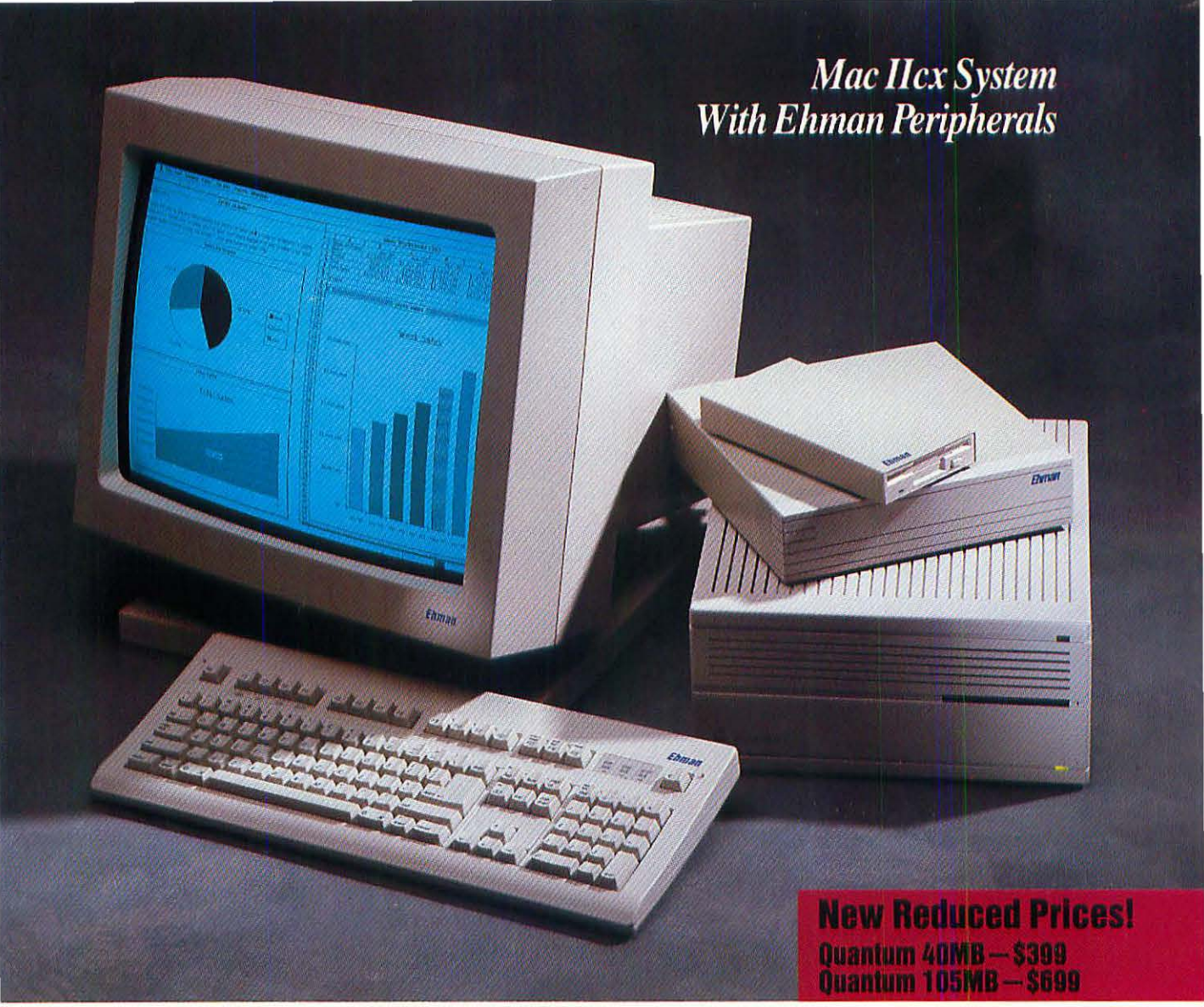
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Circle 500 on reader service card

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80+	*$529*	*$599*
105Q	*$699*	*$799*
135	*$899*	*$999*
180	*$1,049*	*$1,149*
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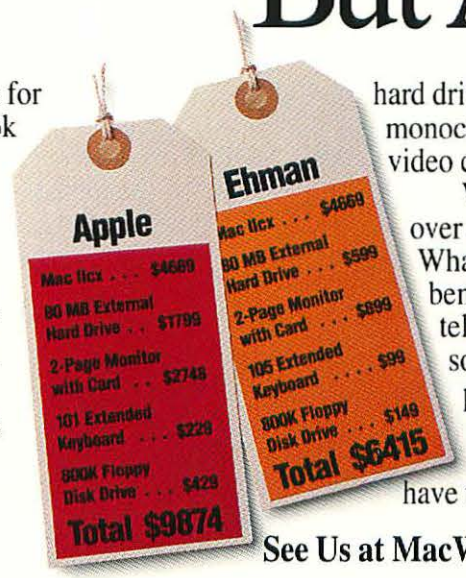
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Most Users Won't No But All Buyers

Next time you buy peripherals for your Macintosh, make sure you look at the price tag and not just the label. You'll find big differences between Apple and Ehman.

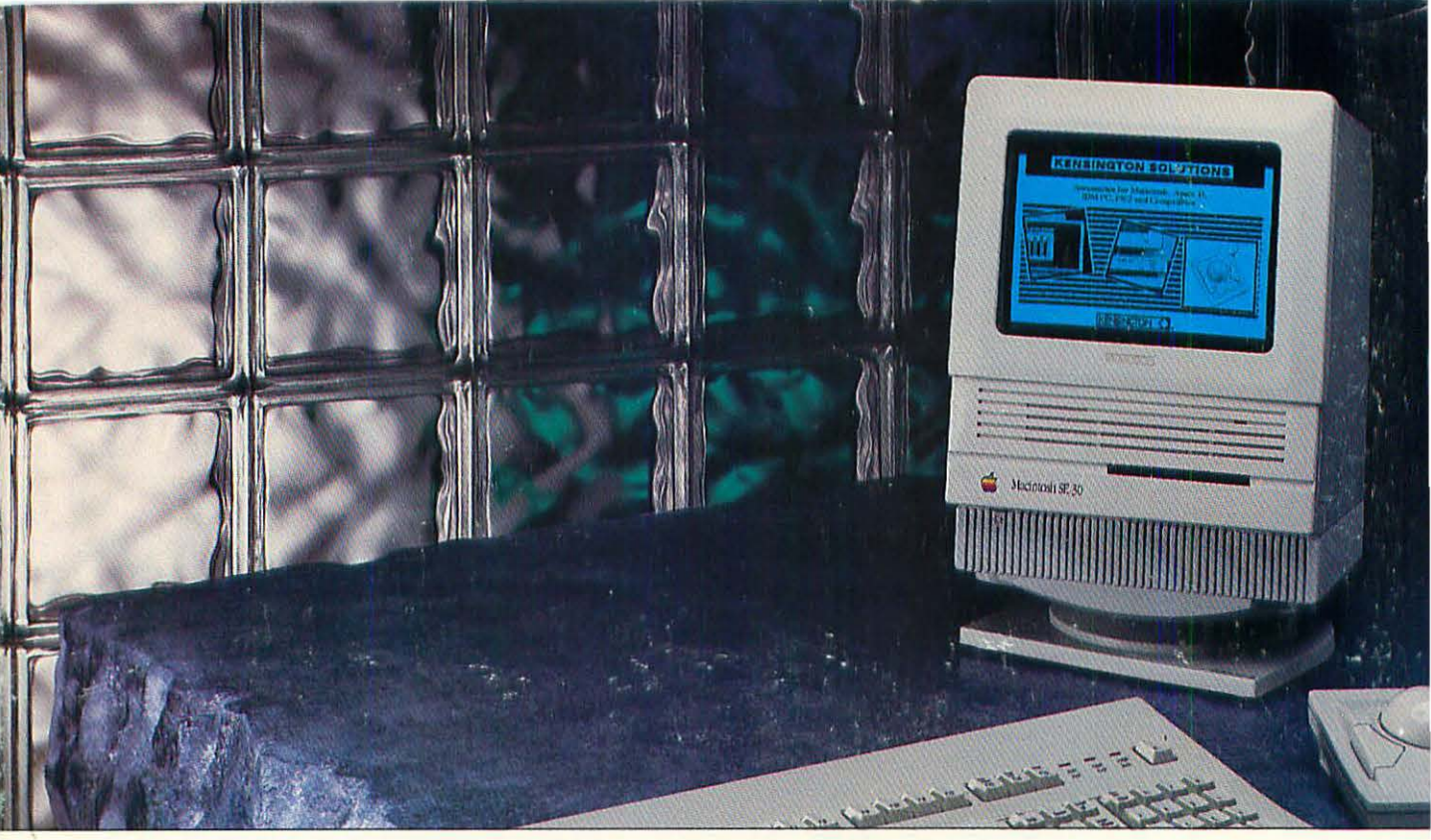
First and foremost, Apple is in the business of making computers. Ehman is in the business of making computer peripherals. And since 1985 we've been out front in providing Macintosh users with the best combination of price and performance available. Like a 20 MB hard drive for just $299, or our new two-page monochrome monitor for only $899 including video card and tilt/swivel base.



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See Us at MacWorld Expo—Moscone, Booth #2237



EYESORE VS. EYE PROTECTION

As today's monitors get bigger and brighter, anti-glare filters become less of an option and more of a necessity.

The right filter can combat eye fatigue, help eliminate headaches, even reduce overall body stress.

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In fact, most filters look like they belong to someone else's system.

The fit is sloppy. The colors don't match. The materials are different.

Kensington has a different idea.

Instead of making a filter that will fit on any monitor, we make filters that will only fit a *specific* monitor.



An example is our Maccessories® SE Anti-Glare Filter.

It looks so much a part of the SE, you would think it was designed by the same people who designed the SE.

The styling is complimentary. The color identical. Even the same material is used.

And unlike generic filters, the fit is perfect. So light passes through the filter, never around it.

Kensington uses only optical quality glass with a ceramic anti-reflection and scratch-resistant coating.



The result is a 96% reduction in glare. And an improvement in contrast and clarity of up to 20 times.

In short, the most advanced eye-protection system you can find today–it even filters out VLF and ELF radiation and dissipates static.

Kensington has custom designed screens for the Mac, Mac Plus, Mac SE, Apple IIGS, as well as for the entire Mac II family of large screen monitors.



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Circle 30 on reader service card

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